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ORIGINAL ARTICLES.

TWO CASES OF RESECTION OF THE CÆCUM FOR CARCINOMA; WITH REMARKS ON INTESTINAL ANASTOMOSIS IN THE ILEO-CÆCAL REGION.

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The two cases reported in this paper are intended to serve as a contribution to the as yet scanty literature of resection of the cæcum. In complete excision of the cæcum the section on the proximal side of the portion to be removed necessarily falls through the ileum near its junction with the cæcum, while on the distal side the ascending colon is divided transversely, which, after the removal of the cæcum, makes it necessary to unite two bowel ends of unequal lumina if an attempt is made to restore the continuity of the intestinal canal by circular suturing. As the resected end of the colon is at least three times larger than the ileac end, circular suturing is impossible without resorting to some device by which the two lumina are made more nearly alike in size. Two methods have been suggested to accomplish this object: 1. The excision of a V-shaped piece from the distal end, the base of the portion to be removed being sufficiently wide, so that after bringing the two margins of the triangular wound in apposition by two rows of sutures, the colon should correspond in size with the ileac end. Against this procedure it can be urged that it requires additional time in making the resection, and necessitates a large number of sutures which are always a source of danger, at the same time there is considerable danger from gangrene at the junction of the circular line of suturing with the line of sutures made parallel to the gut in closing the triangular wound. 2. Oblique resection of the ileum, the lumen being increased at the expense of a part of the convex portion of the bowel. This is the method which Billroth followed in a number of cases. If the section of the bowel is made sufficiently oblique so that the lumen shall correspond in size with that of the distal end, it must be apparent that after the ends have been united by sutures the insertion of the ileum into the colon is at an acute angle, the apex of the angle being directed downwards and the base in an upward direction, a condition which is invariably attended by the formation of a long spur between the lumina of the united intestines. The combined influence of the obliquity of the terminal end of the ileum to the colon, and the presence of a spur between it and the colon results in intestinal obstruction at this point. Experience has demonstrated that the fear of causing a serious and often a fatal obstruction by this method of operating is not unfounded. Billroth lost several cases from this cause, and has abandoned the operation as impracticable and dangerous. There are at present only two procedures which can be employed with safety in uniting bowel ends of unequal lumina after enterectomy: 1. Lateral implantation. 2. Lateral apposition by means of absorbable perforated approximation plates. Billroth now resorts to the former method, and with its adoption the results after excision of the cæcum have improved. If the continuity of the bowel after excision of the cæcum is restored by lateral implantation, the end of the colon is closed by invagination, and a few superficial sutures to prevent disinvagination, and the ileac end is implanted into a slit in the colon, at a point opposite to the mesocolon and about two inches from the closed end. The slit in the colon should correspond in size with the circumference of the ileac end to be implanted. The fixation of the ileum by Czerny-Lembert sutures is a time-consuming and unsafe procedure. Some time ago I devised a method of implantation in such cases which requires in its execution only one-fourth the time consumed in suturing, and the results obtained by it were far more satisfactory. The method consists in lining the ileac end to be implanted with a narrow flexible rubber ring, which is retained in place by a continued catgut suture, embracing

the free margin of the bowel and the lower margin of the rubber ring. The ring itself is simply a narrow rubber band, the length of which corresponds with the size of the lumen of the bowel, and which is converted into a ring by fastening the ends together with two catgut sutures. The implantation is made by two catgut sutures, threaded each by two needles and passed at opposite points from within outwards through the upper margin of the ring and the entire thickness of the bowel, while on the opposite side the needles are only passed through the serous and muscular coats of the colon. After both sutures are in place gentle traction upon all the four ends invaginates the end of the ileum into the incision in the colon, and the colon is drawn well over the end of the ileum to the points where the needles emerged from the ileum. When in proper position, the serous surfaces of the colon and ileum corresponding in extent to the width of the rubber ring are in accurate coaptation, after the two sutures are tied. In my experiments on animals it was found necessary only in exceptional cases to apply one or two additional superficial coaptation sutures. The rubber ring keeps the lumen of the ileum patent for the ready escape of intestinal contents into the colon, at the same time the gentle elastic pressure which it exerts upon the parts around it, is an important element in securing accurate apposition between the coaptated serous surfaces. The implantation sutures can usually be relied upon in maintaining the invagination until adhesions have taken place, but in operations upon the human being it would be well to reinforce them by a number of Lembert sutures after the bowel has been fixed in its place by tying of the invagination sutures. Of the numerous experiments on dogs in which I practiced this method of implantation, I will only cite one in illustration of what has been said concerning the ease of execution and safety of this operation.

"Dog, weight 35 pounds. Ileum divided twelve inches above ileo-cæcal region, distal end closed by invagination and three stitches of the continued suture, and the proximal end lined with flexible rubber ring was implanted into an incision in the transverse colon, and retained by two catgut invagination sutures. An omental flap an inch and a half in width was placed over the junction of the two intestines, and fixed in its place by two catgut sutures. No unfavorable symptoms after the operation. Animal when killed eighteen days later, was in excellent condition. Omentum adherent to abdominal wound, which was firmly united. Omental flap adherent all around. Colon above new opening ten inches in length, completely empty, contracted and atrophic. New opening oval in outline, and as large as the lumen of the ileum."

In this, as well as in a number of other cases, the line of junction between the ileum and colon was covered with an omental flap, and without exception the flap was found adherent throughout, constituting a living bridge between the united intestines joined together. In a number of cases I found at the necropsy the ileum projecting slightly into the lumen of the colon, presenting around the new opening a circular ridge of mucous membrane, which in structure, and probably also in function, represented almost to perfection the normal ileo-cæcal valve. Lateral implantation of the ileum into the colon after excision of the cæcum is a speedy and comparatively safe procedure, and yields excellent functional results, but continuity of the intestinal canal under similar circumstances can be restored by a still more simple and efficient operation, viz: ileo-colostomy by approximation plates of decalcified bone. In this operation the tissues are not damaged by extensive suturing, while, on the other hand, large serous surfaces which it is intended to unite are brought together, and are kept in uninterrupted accurate contact by the absorbable bone-clamp until firm adhesions have formed. The cases here reported are of interest, because in both of them after excision of the carcinomatous cæcum the continuity of the intestinal canal was successfully restored by this method.

Case 1.—Carcinoma of cæcum; excision of cæcum and eighteen inches of ileum with corresponding portion of mesentery. Restoration of continuity of intestinal canal by ileo-colostomy with decalcified perforated bone plates. Recovery.

The patient was a spare man of medium height, 37 years of age, and a farmer by occupation, who came to consult me by the advice of his family physician, Dr. Minnahan, of Cato. The patient is unaware of the existence of any hereditary taint or predisposition to tuberculosis or malignant disease in his family. His health was excellent prior to August 16, 1887. On that day he was taken suddenly ill with an attack of vomiting, without any obvious cause, which lasted for six hours. The patient insists that towards the last he vomited fæcal matter. He recovered rapidly and remained in comparatively good health until the following October, when he suffered from a similar attack of four hours duration. This time he experienced a sharp pain in the ileo-cæcal region, and soon after felt a distinct swelling in that locality. From this time on until March, 1889, the pain recurred periodically, the intervals becoming shorter and shorter until pain became almost continuous with few and only slight remissions. During this time he suffered also a great deal from flatulence, the bowels were inclined to be loose, but the general health was not much impaired. Since March, 1889, diarrhœa became a prominent symptom, the stools being liquid, but showing no trace of

blood or mucus. Pain increasing in severity and more constant, and always partially relieved by the free passage of gas per rectum. At the time he was admitted to the Milwaukee Hospital, October 9, 1889, he had lost 45 pounds in weight. Examination at this time revealed the existence of a hard nodulated fixed tumor in the ileo-cæcal region, and tympanites in the hypogastric and umbilical regions. Distension of the colon by rectal insufflation of hydrogen gas made the tumor more prominent, showing that its location was intra- and not extra-peritoneal. Not much tenderness on pressure. Digital exploration of rectum yielded a negative result. Marasmus and anæmia well marked. For the last seven months the patient has had from four to six liquid discharges from the bowels. Appetite impaired. Temperature normal, pulse from 80 to 90 per minute. From the history of the case, and especially from the character and location of the tumor, a positive diagnosis of carcinoma of the cæcum was made. As the ordinary medical treatment which had been pursued for months afforded but little relief, the consent of the patient and his friends to an operation was readily obtained. Laparotomy was performed on the day of his admission, October 9, 1889. Before chloroform was administered ⅙ of a grain of morphine with $\frac{1}{15}$ of a grain of atropia were given subcutaneously. The strictest antiseptic precautions were carried out before and during the operation. The abdomen was opened by an incision extending from near the middle of Poupart's ligament to a point half way between the anterior superior spinous process of the ileum and the umbilicus. As soon as the peritoneum was opened the tumor came into view. It was now seen that the tumor involved the entire circumference of the cæcum, and its immobility suggested that it was intimately connected with the retro-peritoneal tissues. The ileum and colon were emptied by displacing their contents, and each part was entrusted to an assistant, who was instructed to prevent fæcal extravasation by making digital compression until the completion of the anastomosis. The colon was divided about two inches below the margin of the tumor and the ileum near its junction with the cæcum; both sections showed that the incisions were made through healthy tissue. The bleeding vessels were tied with fine silk ligatures. Several large glands were found in the retro-peritoneal space behind the cæcum, and were enucleated in one large mass with the cæcum and a portion of the peritoneum which was adherent to the glands. After the removal of the cæcum, it was noticed that the mesentery of the lower portion of the ileum contained several enlarged glands, consequently it was removed with about eighteen inches of the ileum. The mesentery was tied in a number of small sections with fine silk ligatures before it was excised. During the whole operation a small compress was kept in the abdominal cavity to prevent prolapse of the small intestines, and to guard the peritoneal cavity against infection in case fæcal extravasation should occur. After all hæmorrhage had been carefully arrested both resected ends were closed by invagination and a few stitches of the continued suture, the first stitch was made to transfix the mesentery at the point where it was invaginated into the bowel. Medium sized perforated decalcified bone plates were used in making the ileo-colostomy by lateral approximation. An incision about two inches in length was made near the closed ends of both intestines at a point opposite the mesenteric attachment, and into each opening a bone plate was inserted, and the lateral sutures, armed with a needle, were passed about an eighth of an inch from the margin of the wound at a point half way between the angles of the intestinal wound. The surfaces of the bowel corresponding to the part covering the plates were freely scarified with an ordinary sewing needle. The visceral wounds were now brought *vis a vis* in such a manner that both closed ends were directed downwards, bringing in this manner the free surface of the colon and ileum together. Before any of the plate sutures were tied a number of Lembert sutures were applied posteriorly, sufficiently far back so that after the approximation they should be just beyond the borders of the plates, thus affording additional security in maintaining coaptation. The posterior pair of transfixion sutures was now tied, after which both pairs of the sutures not armed with needles were tied. During the tying of these sutures it is of the greatest importance that an assistant should keep the plates accurately and closely pressed together. The last sutures to be tied were the second pair of fixation sutures, and as this was being done the bowel on each side was carefully pushed in between the plates with a probe. The sutures were tied in a square knot and only with sufficient firmness to bring the parts in apposition, as any undue pressure would have been detrimental, and might have resulted in gangrene of the tissues included between the plates. The sutures were cut short and the ends brought as near the opening as possible by pushing them in this direction with a probe. After all the approximation sutures were tied, it only remained to apply on the upper side a few Lembert sutures in the same manner as was done on the opposite side before any of the approximation sutures were tied. After the exposed parts were disinfected and dried, the bowel was returned into the abdominal cavity and anchored near the wound with a silk suture, which was made to embrace the parietal peritoneum and mesentery at a point opposite the anastomotic opening. The wound was closed

with two rows of sutures, the first including only the peritoneum. No drainage. The subsequent history of the case was uneventful. The highest temperature was registered on the third day, when it reached 101.6° F., but returned to normal on the fourth day. During the first two days liquid food was administered by rectum. After this time the patient was allowed milk, beef tea and raw eggs, and after another week he was placed on the ordinary hospital diet which he relished greatly. The bowels moved from one to three times daily, the passages becoming gradually normal in color and consistence. The wound healed by primary union with the exception of a small place where a small parietal abscess formed at the end of the first week. On the ninth day half of the plate in the colon passed per rectum, and the following day the remaining half with the plate from the ileum with the sutures attached, was found in one of the stools. The patient left his bed on the twenty-eighth day after the operation, and three days later he returned to his home in the northern part of Wisconsin. At the time he left the hospital nothing abnormal could be felt in the right iliac region; no pain and no tenderness on pressure. He gained rapidly in flesh and strength, and when I saw him again during the latter part of January, 1890, he weighed nearly as much as before he was taken sick. Since the operation he has had no pain, no diarrhœa, and the discharges from the bowels once or twice a day were normal in every respect. At this time, however, I was able to detect a small hard nodulated tumor behind the colon at a point above where the ileum had been attached to the colon, which I regarded as a recurrence of the disease along the chain of lymphatics behind the peritoneum, but no evidence of a return of the carcinoma in the bowel. The specimen removed represents the entire cæcum, a number of retroperitoneal glands, eighteen inches of the ileum with the mesentery attached to it. The carcinoma had evidently started in the ileo-cæcal valve and involved the entire circumference of the cæcum, the walls of which had become greatly thickened by the infiltration. The lumen of the ileo-cæcal opening was not larger than an ordinary lead pencil, and the interior of the cæcum near the ileo-cæcal valve presented a number of deep excavations resulting from the breaking down of the carcinomatous mass. The walls of the ileum for some distance above the cæcum were greatly thickened, and as examination showed the thickening was due to the formation of new muscular fibres, the thickening must be regarded in the light of a compensatory muscular hypertrophy which occurred in consequence of the chronic obstruction at the ileo-cæcal opening. At a point corresponding to the meso-cæcum the carcinoma had reached the outer surface of the bowel, and from here undoubtedly the extension of the disease to the retro-peritoneal lymphatic glands had taken place. Stained sections of the tumor under the microscope showed that the growth was a cylindrical celled carcinoma.

Remarks.—It is interesting to note in this case that, although the carcinoma started in a place where even a slight narrowing may give rise to obstruction, the patient suffered for more than half a year from diarrhœa, which is often one of the most important clinical evidences of the existence of a chronic obstruction, especially when located below the ileo-cæcal valve. The obstruction increases the functional activity of the bowel for some considerable distance above it, and the increased secretion is forced almost as soon as it appears in the bowel, through the narrow opening beyond the seat of obstruction, on account of the increased muscular activity of the hypertrophic portion of the bowel. Chronic obstruction is followed by symptoms of acute strangulation where one of two things happens: 1. If a solid body becomes impacted in the narrowed lumen of the bowel the obstruction becomes at once complete, and the symptoms then rather point to the existence of conditions which are known to give rise to acute obstruction than to a chronic cause.

2. If from any local or general causes the compensatory hypertrophy of the bowel on the proximal side of the obstruction is rendered inadequate, the bowel becomes dilated, and finally completely incapacitated from performing its function, and the clinical picture of chronic obstruction is supplanted by symptoms of acute obstruction. From the history of the case it is evident that the carcinoma commenced more than two years ago, and was the cause of the periodical pain and diarrhœa, both of which symptoms gradually becoming more severe and persistent as the stenosis increased. Cylindrical celled carcinoma of the large intestine, like the squamous epithelioma of the lip, is slow in its growth, and, as a rule, is followed by glandular infiltration at a late date. We have every reason to believe, that had a radical operation been performed in this case before the disease extended beyond the limits of the bowel, the prospect of a permanent cure would have been good. The recurrence of the disease in the retro-peritoneal lymphatic glands four months after the operation only shows the difficulty of eradicating the disease after lymphatic infection has occurred. The new opening between the ileum and colon must have been adequate, as the normal fæcal circulation was restored almost immediately after the operation, and has remained so to the present time. Although a fatal termination from recurrence of the disease in the retro-peritoneal space is inevitable, the results of the operation must be regarded as highly satisfactory. All has been accomplished by the operation that can be expected under

these circumstances, removal of the cause of obstruction without recurrence of the disease in the bowel, and perfect restoration of the continuity, and function of the intestinal canal after such extensive resection.

Case 2.—Carcinoma of ileo-cæcal valve with invagination; Resection of cæcum with portion of colon; Restoration of continuity of intestinal canal by ileo-colostomy with absorbable perforated bone plates; Death six days after operation from peritonitis caused by deep ulcers of excluded portion of colon.

This patient was a corpulent married woman, 53 years of age, who was placed under my care at the Milwaukee Hospital, November 14, 1889, by her physician, Dr. L. Reinhard, of this city. She is the mother of eleven children, and had always been in robust health until a year before she was admitted into the hospital. No history of tumors in any member of the family. Her present illness dates back one year, when she was seized by an attack of vomiting without any apparent cause, as even then she was able to take food without causing any discomfort. The vomiting was not attended by nausea, and subsided after a few days without any special treatment. A month later a similar attack recurred, followed again by apparent complete recovery. During the next six months she suffered from six similar attacks at intervals of one month; each attack lasting for a few days, between them the patient considered herself well. The intervals then became gradually shorter, at first every two weeks, then every week, and finally every second or third day. During all this time she never suffered from constipation, the stools being normal in frequency and character. During the last ten months she has lost forty pounds in weight, and the complexion of the face, which formerly was ruddy, has now become pale and yellow. A tumor was discovered five weeks ago in the umbilical region by her attending physician. At that time she suffered a great deal from pain and vomiting, both of which were relieved by a brisk cathartic. From this time on the bowels moved several times a day, the discharge being liquid, but contained at no time either mucus or blood. A number of physicians who examined the patient since the tumor was discovered in the umbilical region, made a diagnosis of carcinoma of the stomach, and gave it as their opinion, that the tumor involved the great curvature of this organ. Pain and vomiting have been the most prominent symptoms for a number of weeks, and were only partly relieved by subcutaneous injections of large doses of morphia. Although the patient felt more distressed after eating, the vomiting occurred at irregular intervals, and was not always brought on by taking food. A careful examination made the day before operation revealed the presence of a firm movable tumor, somewhat elongated in shape, and about the size of a medium sized orange, a little above and to the right of the umbilicus. The tumor could be easily pushed under the costal arch on both sides, and in a downward direction on the right side nearly as far as the iliac region, but not quite as far to the left side. The mobility was less in a lateral direction. The patient was much emaciated and presented an anæmic, almost cachectic appearance. It was almost the unanimous opinion of those who examined the patient at this time, that the tumor, carcinomatous in character, was located in the large curvature of the stomach, but the possibility of carcinoma of the transverse colon was not excluded. The great mobility of the tumor induced me, at the urgent request of the patient and her husband, to make an attempt to remove it in either event. The operation was performed November 14, 1889. Immediately before the operation the stomach was washed out with a warm saturated aqueous solution of salicylic acid, and, at the same time, morphia and atropia were given subcutaneously. Chloroform was used as an anæsthetic. The abdomen was opened by an incision through the median line, extending from near the ensiform cartilage to the umbilicus. Manual exploration revealed the stomach in a healthy condition, and after careful examination it was ascertained that the tumor consisted of the structures of the ileo-cæcal region which had become invaginated as far as the middle of the transverse colon. The incision was now enlarged in a downward direction for the purpose of securing more easy access to the seat of invagination. Moderate traction upon the bowel below the apex of the intussusceptum and above the neck of the intussuscipiens had no effect in reducing the invagination. I now grasped the invaginated portion with both of my hands, and made firm compression for a few minutes was made for the purpose of diminishing the swelling by squeezing out the blood and œdema fluid, and thus facilitating the subsequent steps in effecting the invagination. The neck of the intussuscipiens was dilated by inserting the tip of the index finger at different points. Traction was then again made as before, and reduction was accomplished, not, however, without making a number of longitudinal lacerations in the peritoneal covering of the intussuscipiens, the rents extending from its neck in an upward direction for two or three inches. The invaginated portion was eight inches in length, and was composed of the entire cæcum, a portion of the ascending colon and a small part of the ileum. An examination of the surface of the intussusceptum, showed that the obstacles to reduction were numerous adhesions between the apposed serous surfaces of the intussusceptum and in-

tussuscipiens, which were forcibly separated during the disinvagination. On submitting the cæcum to a careful examination, it was evident that its interior was occupied by a tumor which appeared to involve the ileo-cæcal opening. The cæcum was therefore opened by a longitudinal incision, and examination of its interior by inspection and digital exploration revealed an ulcerating carcinoma, which occupied the entire ileo-cæcal valve, and had infiltrated a considerable portion of the cæcum. A similar incision was made into the ileum near its insertion into the cæcum, and digital examination through this opening proved that the carcinoma had diminished the size of the ileo-cæcal opening to the diameter of an ordinary lead pencil. Retro-peritoneal and mesenteric glands normal. As the invaginated portion of the colon had been considerably damaged during the reduction of the invagination, it was decided to remove it with the carcinomatous cæcum. Fæcal extravasation was prevented in the same manner as in the preceding case by digital compression of the intestine beyond the line of section. The meso-colon and meso-cæcum were ligated in small sections with fine silk before the parts were excised. The ileum was divided about three inches above its insertion into the cæcum, and the colon about eight inches below the ileo-cæcal valve. Both resected ends were turned inwards about an inch, and the invagination maintained by a few stitches of the continued suture, which embraced only the serous and muscular coats, and one of them also the invaginated mesentery. The continuity of the bowel was restored by an ileo-colostomy with decalcified perforated bone plates in the same manner as in the first case, only that in this instance the incision into the colon was made about six inches from its closed end, as the part below this, which had been the intussuscipiens, could not be trusted in doing its share of the work in establishing the intestinal anastomosis, on account of the pathological conditions which were produced during the time the invagination existed. The peritoneal lacerations which were made during the reduction of the invagination were closed with a few superficial sutures. Scarification of the serous surfaces which were to be included by the plates was done before the approximation sutures were tied, and a number of superficial sutures were applied outside the borders of the plates to aid these in maintaining apposition between a maximum area of serous surfaces. Through the mesentery of the closed resected ends, a suture was passed which was brought out through a button-hole made for drainage in the right iliac fossa, and after the intestine was dropped into the abdominal cavity the approximated portion was drawn into proper position in the ileo-cæcal region by making traction on the suture, and was anchored in this locality by tying the suture over a small roll of iodoform gauze. A rubber drain was inserted through the button-hole, and the abdominal incision closed in the usual manner by two rows of sutures. External dressing was composed of a compress of iodoform gauze, and a thick layer of absorbent cotton, which was retained by wide strips of rubber plaster encircling two-thirds of the circumference of the body. Duration of the operation an hour and a half. The patient reacted well from the immediate effects of the operation, and no untoward symptoms appeared until the end of the third day, when unmistakable symptoms of septic peritonitis developed suddenly, which rapidly increased in intensity as the inflammation became more diffuse. The dressings were now removed and through the drainage opening pus was sought for, but no fluid could be found. Castor oil was given which procured free evacuation. The peritonitis proved fatal on the third day, six days after operation.

Post-mortem four hours after death. Abdominal incision united throughout. Omentum displaced towards the right iliac region and adherent to intestines. Separation of the omental adhesions liberated about half a pint of sero-sanguinolent fluid from the right iliac region. A fibrino-plastic peritonitis which had evidently started near the site of operation was found to have become diffused from here over the lower portion of the peritoneal cavity, being especially well-marked in the right iliac region. Breaking down the adhesions the closed end of the colon was found turned in an upward direction, while the seat of approximation occupied the ileo-cæcal region. At a point corresponding to the cut surface of the meso-colon a disintegrated softened blood clot was found. After removing the coaptated parts with adjacent portion of the colon and ileum, the serous surfaces, which had been included between the plates, were found firmly adherent throughout, and the superficial sutures completely buried underneath a layer of plastic exudation. On connecting the ileum with a hydrant a large stream of water escaped from the gut end of the colon, showing that the new opening was fully established. On closing the open end of the colon the bowel was forcibly distended without causing any leakage, a positive proof that union between the coaptated surfaces was perfect. The remnants of the plates came away by the irrigation to which the specimen was submitted, the one from the ileum was much softened, while in that from the colon about three quarters of the margin of the perforation was still intact. On slitting the bowel open on each side, where the plates had been, the anastomotic communication could be seen from each side as an oval opening with smooth margins lined with mucous membrane through which the thumb could be readily inserted as far as the first point.

The approximation sutures remained attached by one of the marginal threads. The most interesting condition was found in the excluded portion of the colon, that is, in that part below the anastomotic opening which formerly had been the intussuscipiens. An old circular ulcer about a quarter of an inch in diameter with abrupt indented margins was found at a point which corresponded to the space between the two layers of peritoneum of the meso-colon. The ulcer had nearly perforated, and the peritoneum covering it was of an ashy-gray color, showing that it was on the verge of necrosis; this point corresponded to the location of the softened blood clot from where evidently the peritonitis had taken its origin. There can be but little doubt that infection occurred from the ulcer through the necrosed peritoneum, where it was communicated to the blood clot, and from there to the peritoneum. Another ulcer somewhat smaller in size, was found about an inch higher up in the bowel and at a point opposite to the attachment of the meso-colon.

Remarks.—In this case the carcinoma, of the same tissue type as in the preceding case, developed in the region of the ileo-cæcal valve, where it infiltrated the entire circumference of the ileo-cæcal opening, thus giving rise to early stenosis and remote symptoms of intestinal obstruction. As the tumor in the umbilical region was only discovered five weeks prior to the operation, it is somewhat uncertain at what time invagination occurred. The great thickening of the wall of both the intussceptum and the intussuscipiens, the great vascularity and especially the numerous firm adhesions, would rather indicate that the invagination had existed for a long time, perhaps six months or a year. Chronic invagination can exist for a long time without becoming an immediate source of danger. Pohl has described an interesting specimen of chronic invagination taken from a man 62 years of age, who suffered from two attacks of intestinal obstruction eleven years apart. The second attack proved fatal after an illness of eleven days' duration. The post-mortem appearances indicated that the invagination which was found had existed for eleven years, and that the second attack was due to an aggravation of the mechanical difficulties at the seat of invagination, which had given rise to ulcerative inflammation of the mucous membrane lining the intussusceptum, perforation and suppurative peritonitis. The invagination was located in the lower portion of the ileum. The intussuscipiens was 30 ctm. in length, its muscular coat hypertrophic, mucous membrane thickened and very vascular, and some of its folds adherent to the enclosed intestine; on the posterior wall near the mesenteric attachment two perforations were found. The mucous membrane of the intussusceptum was extensively ulcerated; old and firm adhesions at the neck of the intussuscipiens. The mesentery of the ileum, throughout, but especially at the seat of invagination, was much thickened. The ileum above obstruction dilated and its walls thickened. The ileum for some distance in my case was slightly dilated and its walls hypertrophic. The thickening gradually increased as the ileum approached the cæcum. The ulcers which were found in the excluded portion of the colon, and which for obvious reasons I considered the direct cause of the fatal peritonitis, were undoubtedly of long standing and were caused by the invagination. My only regret in this case is that I did not excise the entire invagination, intussusceptum and intussuscipiens, as in case this had been done the patient would not only have recovered from the operation, but would in all probability have been permanently cured. In reference to diagnosis during life, I will repeat that the most urgent and prominent symptoms pointed rather to carcinoma of the stomach than to carcinoma of the cæcum complicated by invagination. In the aged invagination is frequently caused by the presence of a malignant tumor in the bowel below the ileo-cæcal valve, and the obstruction, like in my case, is usually at first incomplete and gives rise to a clinical picture suggestive of chronic stenosis. The absence of blood and mucus in the discharges, of constipation and straining, and the presence of periodical attacks of vomiting, but more especially the great mobility of the tumor, led me to suspect a carcinoma of the great curvature of the stomach rather than the conditions found during the operation. On the supposition that the tumor was located in the stomach, the abdomen was opened by a median incision, which on being enlarged afforded ample access to the parts which were to be treated by operative measures. Had the primary location of the carcinoma been known beforehand and the complication correctly interpreted, it would have been better to open the abdomen by a lateral incision, as was done in the first case. Adequate drainage, should this be required, can be established more readily after an operation through a lateral than a median incision.

INTESTINAL ANASTOMOSIS IN THE ILEO-CÆCAL REGION.

Indications.—Intestinal anastomosis by making an ileo-colostomy with perforated decalcified bone plates must now be accepted as an established surgical procedure in the treatment of the following affections: 1. Irreducible ileo-colic invagination without perforation or gangrene. 2. Cicatricial stenosis in the ileo-cæcal region. 3. Carcinoma of the cæcum with or without excision of the diseased portion of the bowel.

1. If in an invagination of the bowel in the ileo-cæcal region, the most frequent location where this accident occurs, reduction cannot be effected by rectal insufflation of hydrogen gas made while

the patient is profoundly under the influence of an anæsthetic and held in an inverted position, treatment by laparotomy should be resorted to promptly, and in case disinvagination by direct manipulation is found impossible, and no evidences of perforation or approaching gangrene can be detected, the continuity of the bowel should be restored by an ileo-colostomy without excision of the invaginated portion. The pathological conditions in the invaginated portion of the bowel which render the reduction impossible and which later result in gangrene and perforation are always greatly aggravated by the conditions created by the obstruction. If the obstruction is excluded by establishing an anastomotic opening between the intestine above and below it, the violent peristalsis and distension of the bowel on the proximal side of the obstruction are removed and rest is secured for the invaginated portion, an important element in the prevention of further destructive changes. Ileo-colostomy by approximation plates is made a few inches below the apex of the intussusceptum, and enough of the ileum is excluded so as to prevent any undue tension upon the parts included by the plates. Spontaneous reduction may take place some time after the obstruction has been remedied in this manner, and if this should not occur and the obstruction remains permanently, this procedure has rendered it harmless as far as the fæcal circulation is concerned, while at the same time it has placed the invaginated portion in the most favorable condition to recover from the immediate effects of the strangulation.

2. Enterectomy for cicatricial stenosis should never be practiced, as this operation is attended by a great deal more danger to life than an ileo-colostomy with approximation plates, and the latter restores the continuity of the intestinal canal with permanent exclusion of the seat of obstruction. If the lumen of the bowel can be restored by a plastic operation similar to the one which has proved so successful in the operative treatment of cicatricial stenosis of the pylorus, this should be done in preference to an ileo-colostomy, as the danger incurred is not greater than attends this operation, while it offers all the advantages of an enterectomy minus its dangers. The pyloro-plastic operation devised by Heineke-Miculicz consists simply in incising the strictured portion parallel to the duodenum and pyloric portion of the stomach and uniting the wound transversely by a double row of sutures. The same operation is applicable to narrow strictures of the intestines. If on account of the width of the stricture this operation is not applicable, then the next safest and most efficient plan to pursue is to make an anastomosis between the bowel above and below the stricture with decalcified bone plates, which at once renders the obstruction harmless by excluding the affected portion of the bowel permanently from the fæcal circulation.

3. The method and advantages of ileo-colostomy in restoring the continuity of the intestinal canal after resection of the cæcum are well illustrated by the two cases reported in this paper. If, after opening the abdomen for the operative treatment of malignant disease of the cæcum, resection is found impracticable on account of numerous adhesions or extensive involvement of the retroperitoneal or mesenteric glands, the seat of obstruction should be permanently excluded from the fæcal circulation by making an ileo-colostomy with approximation plates. This procedure is far preferable to the formation of an artificial anus above the obstruction, as it removes equally well the symptoms of obstruction, doing away at the same time with the inconveniences and disgusting features necessarily associated with an artificial anus. An ileo-colostomy with decalcified perforated bone plates is not a more dangerous operation than the formation of an artificial anus, and the remote benefits which are derived from it are incomparably superior to the conditions created by an artificial anus.

OPERATIVE TECHNIQUE.

Like all other intra-abdominal operations, an ileo-colostomy for any of the above named conditions should always be done under strict antiseptic precautions. The shock following operations in which the peritoneal cavity is exposed for an hour or more is diminished by a subcutaneous injection of morphia and atropia, given just before the anæsthetic is administered. The temperature of the operating room should not be less than 80° F. during the entire operation. If the bowel is permeable a cathartic is given the day before operation and the following morning the colon and rectum are emptied by the use of high enemata, to which is added some harmless antiseptic such as salicylic or boracic acid.

Incision.—In all operations in the ileo-cæcal region the incision should be made not in the median line, but directly over the organ to be operated on. The incision that affords most ready access to the cæcum is one extending from an inch above the middle of Poupart's ligament to a point halfway between the anterior superior spinous process of the ileum and the umbilicus. In making this incision the director should be entirely dispensed with. With a sharp scalpel the skin and superficial fascia are divided with one stroke of the knife, and then one layer after another of the abdominal muscles is divided in a similar manner until the subperitoneal fat is reached. This is picked up with the peritoneum with two toothed catch forceps and the abdominal cavity is opened between them. The hæmorrhage is arrested at every step of the operation by applying to the bleeding points hæmostatic forceps, without losing any time in tying vessels which subsequently may not require ligation. One or

two fingers are introduced through the small incision made in the peritoneum, and upon them this structure is divided to the extent of the external wound. After the peritoneal cavity is opened the part to be operated on is brought into the wound and prolapse of the small intestines is prevented by packing aseptic gauze or a clean napkin wrung out of an antiseptic solution around it. If not a sufficient number of reliable assistants are at hand, fæcal extravasation can be effectually prevented by elastic constriction of the intestine above and below where the communicating opening is to be made. The mesentery near the bowel at each of the places is perforated with a closed hæmostatic forceps and with this a narrow aseptic rubber band is drawn through, which is then tied with sufficient firmness to prevent the escape of fæcal matter. If the cæcum is to be excised two additional rubber bands are applied to the part to be removed so as to prevent extravasation from this part, after the bowel is divided. The spaces between the rubber ligatures must be carefully emptied by displacing the contents by passing the intestine between two fingers before the rubber bands are tied. The meso-cæcum must be tied in small sections with firm Chinese silk before the cæcum is removed, as otherwise troublesome hæmorrhage is incurred from slipping of the ligatures. After excision of the cæcum and as much of the colon and ileum as may be necessary, both ends are permanently closed by invagination and a few stitches of the continued suture. The best way to effect invagination is to grasp the margin of the bowel where the mesentery is attached with an ordinary catch forceps and to carry this portion into the lumen of the bowel to the extent of an inch, when the remaining portion of the circumference of the cut end will follow, and by a little manipulation about an inch is evenly invaginated, when the first stitch is made on the mesenteric side in such a manner as to transfix the invaginated mesentery and the muscular and serous coats of the bowel. After this is tied a few more superficial stitches are taken, and the first and last stitch are tied together so as to pucker the end of the bowel somewhat in the manner done in tying a tobacco pouch. In making an anastomosis between the closed end of the ileum and colon after resection of the cæcum both ends should be made to lie side by side with the closed ends in a downward direction, and the surfaces to be united should correspond to the part of the intestine opposite the mesenteric attachment. In making an ileo-colostomy without enterectomy the anastomotic opening must be made at least 2 or 3 inches distant on each side from the part which it is necessary to exclude permanently from the fæcal circulation.

PERFORATED DECALCIFIED BONE PLATES.

After having tried all kinds of material, organic and inorganic, absorbable and inabsorbable, for making the apposition plates, I have finally settled on decalcified bone as the most suitable material. In preparing the plates the compact layer of an ox's femur or tibia is cut with a fine saw into oval plates, ¼ of an inch in thickness, 2½ to 3 inches in length and 1 inch in width. The plates are then decalcified in a 10 per cent. solution of hydrochloric acid, changed every twenty-four hours, until they have become sufficiently soft, so that they can be bent in any direction without fracturing. After decalcification they are washed and immersed for a short time in a weak solution of caustic potash, so as to remove the acid. Until quite recently I dried the plates between blotting paper compressed between two pieces of tin so as to keep the plates from warping during the drying process. The central opening and perforations for the threads were made after the plates were dry. Experience has taught me that it is unsafe to use material for plates which when exposed to the fluids of the intestinal canal will imbibe a sufficient amount of fluids to increase to two or three times in thickness, as such increase in the thickness of the plates may cause a sufficient degree of pressure to cause gangrene of the parts included between them. This happened in

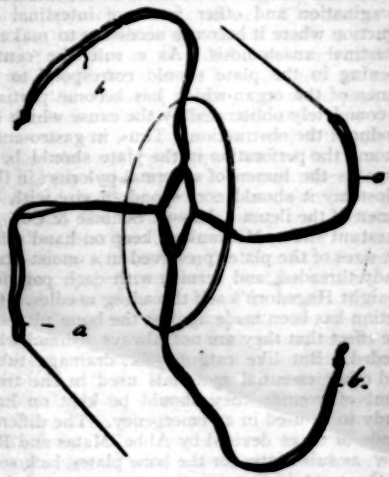

FIG. 1.—Perforated decalcified bone plate, threaded and ready for use. (*a*) Fixation or lateral sutures; (*b*) apposition or end sutures.

at least two of my gastro-enterostomies. Since then I have not dried the plates, but keep them after decalcification in a solution of equal parts of alcohol, glycerine and water which keeps them in a pliable, soft condition, and such plates undergo no change in size after their introduction into the stomach and intestine until they are gradually

removed by absorption and disintegration from the third to the tenth day. After the acid has been removed the central oval opening can be readily made with a sharp penknife, and the four perforations around it for the threads are made with a fine drill, and after the plate is threaded it is kept ready for use in the solution first mentioned.

Any one conversant with the manner in which the plates are threaded can keep them in the solution until they are needed. When the plates are to be used they are washed in a 2 per cent. carbolic acid solution and the threads or sutures attached by threading two fine sewing needles, each with a piece of aseptic silk 24 inches in length, which are tied together; the knots become the ends of the end sutures, while the middle of such thread holds a needle and becomes the terminal part of the lateral or fixation sutures. The fastening of the threads upon the plate is done by the lock stitch by another thread passing through the perforations in the shape of a loop and fastened at the back. I now keep on hand three different sizes of the plates. The largest size is used for gastro-enterostomy, the second for intestinal anastomosis, and the smallest plates are intended to be used in operation on children in cases of congenital stenosis of the intestines, invagination and other forms of intestinal obstruction where it becomes necessary to make an intestinal anastomosis. As a rule the central opening in the plate should correspond to the lumen of the organ which has become partially or completely obliterated by the cause which has produced the obstruction. Thus, in gastro-enterostomy the perforation in the plate should be as large as the lumen of a normal pylorus; in ileo-colostomy it should correspond in size with the lumen of the ileum. Messrs. Schorse & Co., 302 Chestnut street, Milwaukee, keep on hand different sizes of the plates preserved in a moist state, ready threaded, and furnish with each pair four straight Hagedorn's self-threading needles. Objection has been made against the bone plates to the effect that they are not always at hand when needed. But like catgut, silk, drainage tubes, and other essential materials used in the treatment of wounds, they should be kept on hand ready to be used in an emergency. The different kinds of rings devised by Abbe, Matas and Brokaw, as substitutes for the bone plates, lack some of the most important advantages possessed by the plates. Catgut is a material which, when brought in contact with the alkaline secretions of the intestinal canal, becomes, in a few hours, so soft and macerated that it cannot be relied upon as a support. All ring supports bring into apposition only a small area of serous surfaces, and the pressure is not equally distributed. Davis' catgut mats are superior to the catgut rings, but the material of which it is composed is so highly hygroscopic that when acted upon by the intestinal contents they swell up rapidly and become as soft as a rag in a few hours. I immersed one of the plates which Dr. Davis kindly sent me in a warm solution of common salt, and in three hours it had increased to three times its former thickness and had become so limpid that in the same condition in the intestinal canal it would furnish little or no support in maintaining uninterrupted apposition. The same objection applies to the catgut rings and catgut mats as to the dried bone plates, that when used in the dry state they increase rapidly in thickness from the imbibition of fluids, and as the sutures are unyielding the pressure thus produced may become a cause of pressure gangrene.

An extensive clinical experience and numerous experiments on animals have satisfied me that thus far no better material has been suggested for making the approximation plates than decalcified bone. Decalcified bone plates kept moist in an antiseptic solution do not increase in thickness by imbibition of fluids when used in the stomach or intestinal canal, and they serve as an efficient mechanical support in bringing together and maintaining accurate coaptation of large serous surfaces which it is intended to unite in establishing an intestinal anastomosis. The decalcified bone plates can be relied upon in maintaining equable surface pressure upon the tissues interposed between them for at least three or four days, which is the time required in obtaining a sufficiently firm union by cell proliferation from the apposed serous surfaces. Indestructible and inabsorbable material should never be used in the preparation of approximation plates, as such substances in the stomach or intestines, where they are used, may cause irritation, or even ulceration and perforation; or they may pass on and become impacted in the narrowed portion of the bowel. Dr. Stamm, of Fremont, O., made plates of the thin portion of the scapula of a calf, and used them in a gastro-enterostomy for carcinoma of the pylorus. The patient died forty days after the operation, and at the necropsy the plate inserted into the stomach was found unchanged in this viscus.

Incision of the bowel.—In ileo-colostomy the bowel is incised on the convex surface opposite the attachment of the mesentery and near the closed end, if the cæcum has been resected, and two or three inches from the obstruction, if the conditions do not require or justify an enterectomy. The incision must be large enough to readily admit the insertion of the plate without using any force, and yet not too large, as, if this mistake is made, the plate may escape through the incision after the sutures have been tied. Hæmorrhage from the visceral wound is usually slight and ceases spontaneously; but should it become necessary to arrest it, it is much better to

use the continuous catgut suture than to attempt to ligate the bleeding points. The best way to make the incision is to compress the bowel between the thumb and index finger of the left hand in a direction parallel to the organ, and then with a sharp-pointed bistoury perforate the wall of the bowel and cut from within outwards between the fingers in an upward direction.

Insertion and fixation of the plates.—As the incised bowel is supposed to be empty and kept so either by digital compression or by elastic constriction with a rubber band, there is no danger of fæcal extravasation taking place. Mucus and small particles of fæcal matter are removed with small pledgets of gauze or antiseptic cotton. The plate is inserted while the bowel is held in the same position as when the incision is made. The plate is inserted edgewise, and as it is completely in the lumen of the bowel, traction is made on the sutures in such a manner that the plate makes half a turn, so that its upper surface faces the wound. It is now accurately adjusted, so that its ends are equidistant from the angles of the visceral wound. The plate is then fixed in this location by transfixing the entire thickness of the wall of the bowel near the margin of the wound with the needle attached to the lateral or fixation suture.

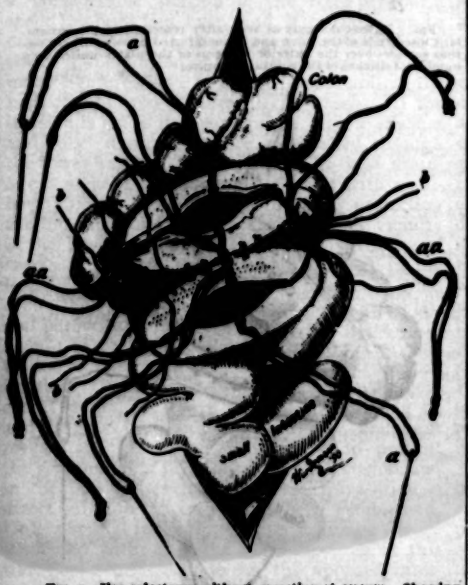

FIG. 2.—Ileo-colostomy without resection of cæcum. Showing plates in position, one in the ileum, the other in the colon. (*a*) lateral or transfixion sutures passed through the margin of the wound. (*aa*) end ligatures hanging out of the wound. (*b*) posterior row of superficial or Lembert sutures.

The lateral sutures are intended to draw the margins of the wound asunder after tying, and prevent the slipping of the plates, and for these reasons they merit the designation "fixation suture." The end sutures serve to retract the angles of the wound and assist in holding the coapted parts in apposition after they are tied. After all the sutures are tied the opening presents a diamond-shaped appearance.

Scarification of the serous surfaces.—In ileo-colostomy by approximation plates a maximum area of serous surfaces is brought together and should be kept in accurate contact by the plates until they have united by the interposition of new tissue derived from proliferating endothelial and connective tissue cells. If anything can be done to stimulate the process of regeneration, definitive healing is accomplished in a shorter time. It is a well known fact in surgery that approximation of intact serous surfaces does not result in the formation of a lesion. When the surgeon desires to secure union between serous surfaces he resorts to mechanical irritation for the purpose of inducing a circumscribed plastic peritonitis, which invariably results in adhesions and obliterations of the serous space. Reasoning from this analogy, I was induced to study experimentally the effects of traumatic irritation in hastening the formation of a lesion and cicatrization between apposed serous surfaces. The results of the experiments show that serous surfaces of the intestine which were scarified before apposition was made with bone plates formed adhesions earlier, and the definitive healing was accomplished in a much shorter time, than in cases where the peritoneum was left intact. In most of the cases the inflammatory process was limited to the portion of the bowel interposed between the plates. Without exception the adhesions formed were firmest and the definitive healing was initiated first when scarification was performed, results which clearly demonstrate the fact that the reparative process between serous surfaces which it is intended to unite is hastened by traumatic irritation. Traumatic irritation with the point of an aseptic needle is the most potent means to provoke a circumscribed plastic peritonitis, and is followed within a few hours by a copious exudation of plastic lymph, which, like a cement substance, mechanically agglutinates the coaptated surfaces. The same measure, by destroying the continuity of the non-vascular endothelial layer of the peritoneum, brings at once in contact the vascular network of both sides and opens up a direct route for the new vessels, an important element in the rapid healing between the surfaces held in contact by the plates. Davis, of Birmingham, has made some adhesion experiments by scratching off the endothelial lining of the peritoneum, and claims that adhesions form more rapidly than after scarification. I should not feel warranted in depriving the peritoneum of the

histological elements which, above all others, take the most active part in the production of new tissue. In inflamed serous surfaces karyokinetic figures are seen earliest in the endothelial cells, and the inflammatory product from the fixed tissue cells are derived largely from this source. Scarification inflicts the necessary degree of traumatic irritation without loss of tissue, upon which depends so much in the subsequent process of repair. When the plates are *in situ* the serous surface of the bowel over an area corresponding to the size of the plates should be scarified with an aseptic needle. The scarification should not be so deep as to cause bleeding, but only deep enough to tear the endothelial lining. I am in the habit of making straight lines, which are crossed by other lines, mapping out, as it were, the endothelial surface into small squares representing a diminutive mosaic pavement.

Approximation of the intestines.—After both surfaces have been thoroughly scarified the intestines which it is intended to unite are brought together by an assistant in such a manner that the two wounds are directly opposite each other.

The approximation sutures are now properly arranged so that when they are to be tied the corresponding threads can be readily found. Before any of the sutures are tied it is well to unite the serous surfaces along the posterior margins of the plates with a few superficial sutures. (Fig. 2 b.) After this has been done, the posterior pair of fixation sutures is tied with sufficient firmness to approximate, but not to compress, the parts between them. The sutures are to be tied always in a square knot so as to prevent slipping of the knot. Next the pair of end sutures away from the operator is tied, and when this has been done the opposite pair is tied. All of the sutures are cut short as soon as they are tied. The last sutures to be tied are the remaining fixation sutures, and while these are being tightened the margins of the bowel are inverted between the plates with a director or probe. The cut ends of the last knot are pushed with a probe towards the opening. Approximation has now been completed and all that is left is to reinforce the action of the plates by suturing the serous surfaces over the anterior margins of the plates by a few stitches of the continued suture.

The part of the intestine exposed during the operation should now be thoroughly cleaned by irrigation with sterilized hot water, and after being well dried with an antiseptic sponge or dry gauze, the part clamped together by the bone plates is ready to be replaced into the abdominal cavity after having first thoroughly cleansed and dried the iliac fossa.

Anchoring of the seat of anastomosis.—As the blind end of the colon is to serve the part of the artificial cæcum in the future, and the new opening will serve as a substitute for the ileo-cæcal

FIG. 3.—Ileo-colostomy as seen after resection of the cæcum. (*a*) Closed ends of the colon and ileum directed downwards; (*b*) serous surfaces over the anterior margins of the plates united by a number of stitches of the continued suture.

FIG. 4.—Ileo-colostomy, completed as seen without resection of the cæcum.

opening, these parts should be assigned the place occupied previously by the organs removed. Anchoring of the seat of anastomosis in the ileo-cæcal region is an important step of the operation, as it will secure the most favorable anatomical and physical conditions for restoration of the normal fæcal circulation, and will at the same time keep the parts in the neighborhood of the wound, an important matter should anything go wrong at the seat of operation. Should perforation or suppuration occur these conditions are more readily accessible and can be more efficiently dealt with in the right ileac region than if the anastomosed parts are dragged away into some more remote part of the abdominal cavity, perhaps buried among a number of coils of the small intestines. The anchoring can be readily done by passing a small suture through the mesentery in the direction of the blood-vessels opposite the new opening on one side and through the peritoneum and the subserous structures at the proper point of the other, and tying with sufficient firmness to bring the parts into apposition. Scarification of a limited area of peritoneum on both sides will hasten the formation of adhesions and increase their power of resistance.

Drainage—Drainage is always indicated when a considerable portion of the retro-peritoneal space has been laid bare, and it could never be dispensed with if in the course of a resection of a considerable portion of the large intestine where many ligatures have to be used in controlling the hemorrhage from the mesenteric vessels. If the incision is made in the inguinal region efficient and direct drainage can be established through the lower angle of the wound. The best drainage is secured by combining tubular with capillary drainage. This can be done by protecting the intestines and the peritoneum in the vicinity of the lower portion of the wound with several layers of idoform gauze, which is used in the form of a ring through which is inserted a glass drain, the size of the little finger, with small lateral perforations in its distal end. A glass drain should reach sufficiently far to carry away the wound secretions from the seat of visceral approximation. With the bowel anchored in the ileo-cæcal region, the gauze tampon surrounding it, and the glass drain in close proximity, abundant precautions have peen provided for to prevent the accumulation of intra-peritoneal effusion, and in the possible event of fæcal extravasation a direct outlet for its escape has been established. Unless special indications arise, drainage can be dispensed with after the third day, as at this time firm adhesions between the apposed intestines have taken place, and transudation will have ceased.

Closure of abdominal incision.—The closure of an incision in the abdominal walls in any other place than the median line requires special care. An incision through the different muscular layers of the abdominal wall closed in the ordinary manner with one row of sutures is very liable to be followed later by the formation of a ventral hernia, on account of the peritoneum on each side of the wound becoming everted, thus interfering with the accurate coaptation of the muscular layers and the resulting cicatrix only too often permanently separates the muscles. To prevent the interposition of the peritoneum between the muscles it is absolutely necessary to unite it separately with fine silk sutures, which are cut short and buried. The remaining portion of the wound can be accurately approximated by a second row of sutures. These sutures should not include more than one-twelfth of an inch of the skin and embrace all of the muscular layers. If, as is usually done, more skin is included, there is danger of the skin becoming inverted, which again interferes with an ideal healing of the wound. A few superficial stitches between the deep sutures will secure accurate coaptation between the superficial portion of the margin of the wound.

Dressing of the wound.—In operations where drainage is unnecessary the wound is dusted with iodoform and covered with a strip of protective silk. Several layers of iodoform gauze are then applied and over these a thick compress of salicylated cotton, all of which is retained by a number of strips of rubber adhesive plaster, long enough to encircle two-thirds of the circumference of the body. As an additional protection against subsequent infection, and as a means of exercising equable compression, a thick layer of ordinary cotton is applied over this dressing and retained by an ordinary abdominal binder or roller bandage. If it is necessary to establish drainage a somewhat similar but less bulky dressing is applied, but a space is left for the drainage tube which is kept aseptic by keeping it closed with a plug of antiseptic cotton. This is removed as often as required, every three to six hours, and the fluid which has accumulated is withdrawn with an ordinary syringe to the nozzle of which an aseptic rubber tube is attached. I have always been in the habit after exhaustion of the glass tube to fill it again with a warm physiological solution of salt which is withdrawn in a similar manner.

After-treatment.—During the first twenty-four hours the patient is nourished exclusively by rectal feeding. Thirst is quenched with small pieces of ice in the mouth, sipping of hot water, and if there is much prostration, brandy and water are given. Peristaltic action of the bowels is suspended by a few small doses of opium. The bowels should not move for at least forty-eight hours. Should at this time tympanites set in, a mild laxative, such as castor oil or one of the mild saline cathartics, can be given, and the

action hastened if required by a small stimulating rectal enema. On the second day small quantities of fluid nourishment can be given by the mouth, and in the course of a week a light solid diet is prescribed. The sutures are removed at the end of the first week, but the external support by strips of adhesive plaster and a well-fitting binder must be continued until the completion of the definitive healing of the abdominal wound which requires at least three weeks. The patient should not be allowed to sit up or leave his bed before the expiration of this time. The plates will come away with the fæcal discharges about a week after the operation.

CONCLUSIONS.

1. Resection of the cæcum for carcinoma can be done with a fair prospct of a permanent cure if the operation is performed before infiltration of the retro-peritoneal and mesenteric glands has occurred.

2. Ileo-colostomy with absorbable perforated approximation plates is the best method of restoring the continuity of the intestinal canal after excision of the cæcum.

2. The best material for approximation plates is decalcified bone preserved in an antiseptic solution.

4. Hygroscopic and indestructible or inabsorbable material should not be used in the preparation of approximation plates or rings as the former may cause pressure gangrene, and the latter may prove a source of danger by remaining permanently as a foreign body in the organ in which it has been introduced.

5. Ileo-colostomy without resecection of the cæcum is indicated in cases of intestinal obstruction from inoperable carcinoma of the cæcum, irreducible invagination without perforation or evidences of gangrepe and in cicatricial stenosis in the ileo-cæcal region not amenable to a plastic operation.

6. Scarification of the serous surfaces interposed between the bone plates is the most reliable means of hastening the formation of adhesions and of shortening the process of definitive healing.

7. Resection of the cæcum and ileo-colostomy with or without enterectomy should be done through a lateral incision, extending from near the middle of Poupart's ligament to a point halfway between the anterior superior spinous process of the ilium and the umbilicus.

8. Suturing of the serous surfaces just beyond the margins of the bone plates renders material aid in maintaining apposition between the serous surfaces which it is intended to unite and furnishes an additional safeguard against fæcal extravasation.

9. Anchoring of the approximated parts in the ileo-cæcal region with a mesenteric-peritoneal suture should be done in ileo-colostomy after resection of the cæcum.

CONCUSSION OF THE SPINAL CORD, BRAIN, ETC.

Read in the Section of Surgery and Anatomy at the Forty-first Annual Meeting of the American Medical Association at Nashville, Tenn., May 20, 1890.

BY B. A. WATSON, A.M., M.D.,

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The term "concussion of the spinal cord" is commonly used in a very loose and indefinite manner. In some instances its use is restricted to those cases in which the functions of the cord are temporarily disturbed, independently of any discoverable lesions; while in other instances it is made to include cases in which there are hæmorrhagic extravasations into the substance of the cord, or even a contusion of its membranes. Mr. Erichsen has employed the term in even a broader sense than that which includes the punctate hæmorrhages, etc., since he embraces the following conditions: 1. A functional disorder. 2. Compression of the cord from extravasation; compression of the cord by inflammatory exudations; nutritive cord alterations. It is therefore apparent that Mr. Erichsen, when he employs the term "concussion of the spine," intends to include all morbid conditions arising either primarily or secondarily from traumatic injuries not connected with fractures or dislocation of the vertebræ. In our consideration of "Concussion of the Spinal Cord, Brain, etc.," we shall include all those morbid and pathological conditions arising from the application of concussive force to these organs. By concussive force we mean that agitation communicated to one organ by a fall or blow upon another. For the purpose of illustrating this idea, let the force be applied to the nates while the spinal column is maintained in an erect position, then there will be carried along this bony structure a vibratory motion which will also be imparted in varying degrees to the adjacent soft parts. A careful study of the anatomical structure of the spinal column and cord, their relation to each other, and likewise their relation to other organs, especially the brain, lungs, liver and kidneys, when examined in connection with the seat of the application of the concussive force, possesses a very high degree of interest. It will be readily observed that the normal curves of the spinal column cannot fail to exert an influence on the localization and character of the pathological lesions produced by a concussive force applied to the nates. It is likewise true that these curves exert a modifying influence on *all the lesions* resulting from concussive force; but the same can only be intelligently studied when the surgeon fully understands the nature of the power employed and the locality to which it has been applied. In order to illustrate this subject more clearly the reader's attention is directed to the following cut, in which the antero-posterior curves of the spinal column may be

studied. These curves correspond to the different regions of the column, and are designated cervical, dorsal, lumbar and pelvic.

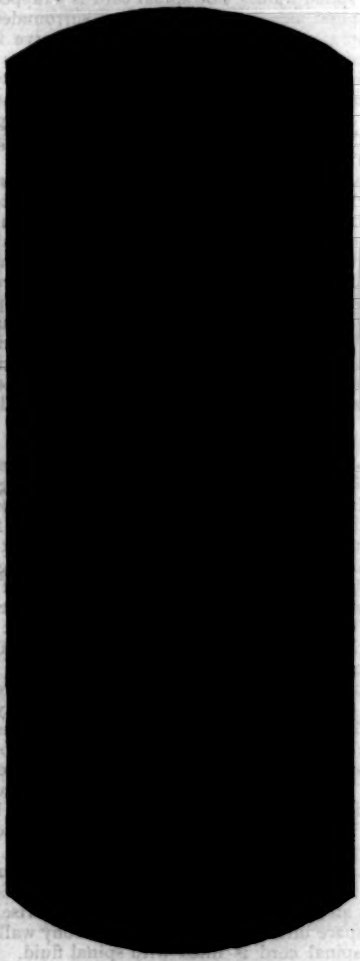

FIG. 1.—Lateral view of the spine.

The examination of this figure makes it readily apparent that if the concussive force is applied to the nates while the spinal column is maintained in the erect position, the greatest power will be brought to bear on the sacro-vertebral articulation. The chief factors entering into this calculation are leverage and the superincumbent weight of the body. It likewise logically follows that if the centre of gravity be thrown either forward or backward the resulting traumatisms may be materially modified. I am now prepared to show by the results of numerous experiments that the conclusion which I have expressed is strictly correct.

In a brochure which I have recently published, entitled, "An Experimental Study of Lesions Arising from Severe Concussions," there will be found a report of 141 experiments. In 135 of these experiments the concussive force was received on the nates, and besides the other traumatisms thus produced there were eleven cases of rupture of the spinal ligaments, and ten of this number occurred at the sacro-vertebral articulation, and the other between the fifth and sixth cervical vertebræ. It was still further observed that in six cases there was a considerable amount of blood extravasated within the pelvic cavity, and in five cases there were ecchimoses in the psoas muscles. The examination of the report of these experiments also shows that there were four cases of fractures involving the spinal vertebræ, and two of these were located in the lumbar region. I think it will now be readily admitted that true concussive force exerts the highest possible degree of potency on the spinal cord when applied to the nates while the body is maintained in the erect position; and, furthermore, that the most marked and numerous traumatic lesions observed in these cases are associated with injuries of the spinal column in the lumbar region. Let us now enter on the consideration of several important questions bearing on the etiology of spinal concussion.

1. Are there any cases of this morbid condition arising from concussive force in which the functions of the spinal cord are temporarily disturbed, independently of any discoverable lesions?

2. Are any of the following pathological conditions, viz.: punctate hæmorrhages, hyperæmia, blood in the perivascular spaces of the gray matter, etc., ever produced by concussive force while the bony walls of the spinal column and the ligaments of the same remain in the normal state?

3. How, and by what sort of force, are these morbid conditions most frequently caused?

Let us here attempt a seriatim reply to these queries. I therefore think it wise to inform my hearers that in my consideration of these questions I shall view my subject from the standpoint of a surgeon, rather than that of an alienist. The essential difference between the surgeon and the alienist is that the former presents his views from the standpoint of demonstrated facts, while the latter accepts a theory and then attempts to make all else conform to the god which he has erected. In other words, surgery is to-day essentially an exact science, while insanity rests entirely on a speculative basis, and, therefore, it can only be regarded as a pseudo science.

It will be here observed that when this ques-

tion is examined from a pathological standpoint there *can be only negative evidence adduced*, and this would scarcely justify an affirmative answer. My experimental studies have added nothing in the affirmative, but, on the contrary, have materially strengthened the negative side of the question. I am therefore constrained, by the want of space, to answer this question negatively, although it is quite possible that by so acting I open myself to the charge of dogmatism.

In attempting an answer to the second query I shall preface my efforts by calling attention to the anatomical structure of the spinal column and cord, and their relations to each other, and afterwards bring forwards the results of my experimental studies for the further elucidation of this important question.

It can be readily seen that no part of the human skeleton plays a more important rôle in the preservation of life by protection of vital organs than the spinal column. Within this bony column is situated the spinal canal, beautifully and perfectly arranged for the reception of the spinal cord. This highly important structure is composed of thirty-three vertebræ, and these are artistically and strongly fitted together in such a manner as to allow every necessary movement, since the spinal column is both flexious and flexible. The articular surfaces of the vertebræ are covered with cartilages exactly suited to their wants. The various bony processes projecting from the vertebræ serve as the point for the attachment of muscles, and at the same time as a *cheval de frise* in warding off blows from the citadel. The numerous heavy muscles of the back serve to cushion externally, and thus protect the spinal column. In addition to this they afford a support and protection to the deeper seated tissues, and likewise give the required motions.

The segmentation of the spinal column possesses, in some cases, when the concussive force is applied in certain directions, a highly important modifying effect. The cartilagenous coverings of the articular surfaces, and also, to some extent, the osseous structure of the vertebræ themselves, act as cushions or buffers, by which the concussive force is greatly diminished at each articulation. This principle has been long understood, and is now generally applied to all the passenger trains on railways. Let us now present a few practical points connected with the anatomy of the spinal canal and the spinal cord, without entering into a full consideration of the anatomical structure of these parts, which can be readily examined by a reference to the text books on this subject. The spinal canal serves for the passage of the spinal cord, and presents everywhere a markedly smooth and even surface, which is lined by the medullary membrane. It is also so large that the spinal cord and its membranes are at no point adherent or in contact with it; in fact they do not nearly fill it. The bony wall of this canal is everywhere cushioned with connective or adipose tissue, and the intervening space is filled with spinal fluid. The spinal cord is wrapped by the spinal membranes, and this is surrounded by the spinal fluid, and every vertebral nerve is so placed as to act as a most efficient stay, thus preventing any swaying or other motion. Dr. Byron Bramwell, of Edinburgh, says: "The relationship of the cord and the nerve roots to the spinal membranes (dura, arachnoid and pia) is of great practical importance, and is as follows: The spinal dura mater is a dense, tough membrane, which is loosely attached externally to the bones of the spinal canal, being separated from the periosteum by loose areolar tissue, fat cells and blood vessels, which forms a loose covering or sheath for the spinal cord and its nerve roots, surrounded by the pia, arachnoid and spinal fluid."[1] The following illustration, it is thought, will greatly facilitate the study of the relationship of the cord and nerve roots to the spinal membrane, while it also affords a very correct idea of the relation of the spinal cord to the spinal column and other important parts.

Let us now turn our attention to certain anatomical peculiarities which possess important relative bearings on concussion in these organs. We have already observed that the spinal cord is wonderfully protected against any injury from concussive force. It will now be seen that the anatomical peculiarities of the surroundings of the brain especially endanger the safety of this organ from that force. It is stated in the standard text books on human anatomy that the weight of the spinal cord is about thirty-three per cent. of the weight of the brain.

The weight of the brain, being so much greater than that of the spinal cord, increases greatly the liability of this organ to injury from concussive force. All the advantages arising from the buffer action, which has been previously mentioned, is lost, in case the concussive force is applied to the cranium, and the whole momentum of the blow will be transmitted directly from the skull to the encephalon.

Furthermore, we have called attention to the fact that the spinal canal is everywhere cushioned with areolar and adipose tissue, and likewise that the space intervening between this bony wall and the spinal cord is filled with spinal fluid. The encephalon, on the contrary, possesses no such protection against concussive force. In this case the membranes of the brain are placed in immediate contact with the bony walls of the cranium, without the intervention of soft tissue cushions or the presence of a water bed. The following cut presents a view of a portion of the encephalon, and likewise the entire spinal cord in its

[1] "Diseases of the Spinal Cord," p. 14 *et seq.*, 2d edition, 1884.

relation to the spinal nerve roots and some of the other surrounding parts.

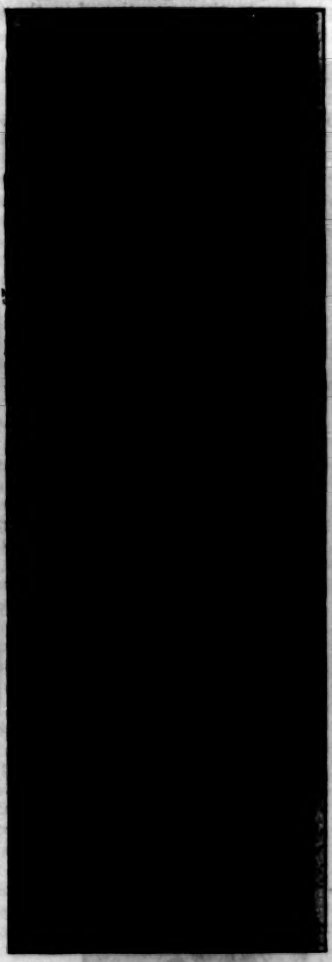

FIGURE 2.

Our own experimental work was done on dogs; and, therefore, that the anatomical peculiarities of these animals may be compared with those of man, we have here introduced the following illustration, which presents both the anterior and posterior view of the spinal cord, spinal nerve roots, etc.

The whole number of these experiments were 141, but there were only 46 of these cases in which pathological lesions were produced in the cerebro-spinal axis or its membranes.

There were twenty of these forty-six cases in which the post mortem examination distinctly

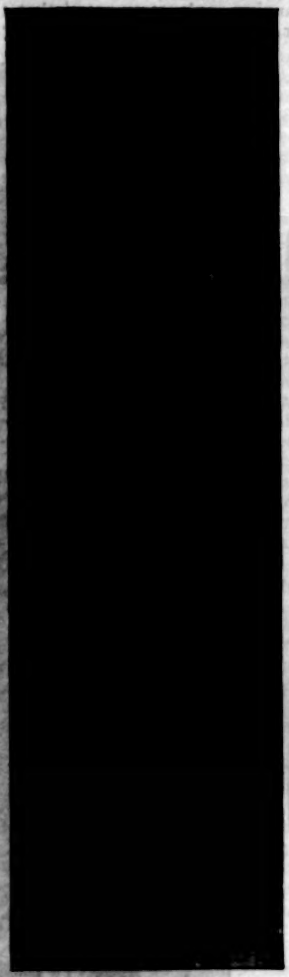

FIGURE 3.

revealed a want of continuity in the spinal column, and these complicating injuries were as follows: Rupture of the vertebral ligaments, 11; fractions involving the bodies of the vertebræ, 5; stretching of the vertebral ligaments, 4. It will now be observed that there are twenty-six cases in which the spinal column apparently remained uninjured. There were four cases in these twenty-six which were complicated with

lesions which quickly terminated in death. It will likewise be seen by a reference to the accompanying explanatory notes[1] that there are six other cases included in our total of cerebro-

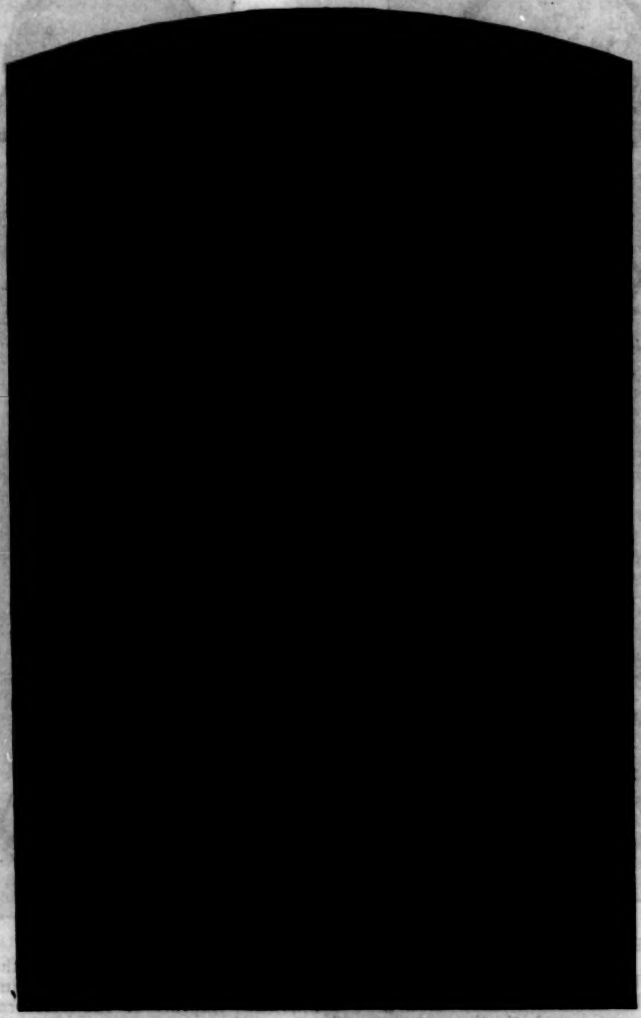

FIGURE 4.

spinal lesions where the question of the causation of these pathological changes justly raises the query—shall they not be excluded in this enumeration?'

Notwithstanding all this it must be admitted that these experiments have conclusively shown that pathological changes in the spinal cord, corresponding to those mentioned in the second query (2), may be produced by concussive force, while the bony walls of the spinal column and its ligaments remain in their normal state. The answer of the second query likewise includes in some degree the reply to the third question, since it shows that in the spinal cord concussive

force may produce pathological changes. In fact, it must be self-evident to us that these pathological changes occurring when there is neither a fracture of any portion of the spinal column, a rupture of the spinal ligaments, or a stretching of the same can only be caused by a true concussive force.

The next point demonstrated by our experimental studies is, that the force required for the production of these lesions must be comparatively very great, since only a limited number of these injuries resulted from a large number of experiments, although the force employed was highly efficient, as is shown by the production of severe and numerous traumatisms in the other organs (4).

In this connection it seems quite proper to call attention to the fact that the more limited the area to which the concussive force is applied, while the force remains otherwise unchanged, the more concentrated and destructive will be the effects produced by it, especially on animal bodies. It may therefore be logically assumed that the same concussive force when applied only to the nates will be much more effective than it would be if distributed over the greater portion of the posterior surface of the body. Bearing directly on this point is the fact that I made six experiments in which the blows were delivered on the posterior surface of the body—along the course of the spinal column, which produced no evidence of any concussion.

I will here affirm that my anatomical and experimental studies of this subject have rendered me absolutely skeptical in regard to the production of pathological lesions in the spinal cord by any concussive force applied evenly over the greater portion of the posterior surface of the body. It must, however, be admitted, that if the concussive force be complicated with any other power which destroyed the continuity of the spinal column, then pathological changes in the spinal cord would be very likely to follow, although this is not an invariable result. True concussive force when thus applied would invariably produce death by traumatic lesions in other organs before its pathological effects would be manifested in the spinal cord. It may therefore be confidently asserted that these pathological changes in the spinal cord are commonly produced by a compound force.

Let us suppose for the purpose of illustrating our views, that the spinal column has been struck by a musket ball which has in some degree impaired its external continuity without producing any lesion in the osseous tissues of the canal; but there are discovered numerous pathological changes in the cord, how are these to be explained?

It will readily be admitted that these lesions are produced in many casss by a direct and concentrated concussive force applied to the spinal column which has been transmitted to the spinal cord.

It will not, however, be claimed by any one that this injury done to the spinal column resulted from concussive force. It will here be acknowledged by all that the injury done to the bony structures was caused by the projectile force given to the bullet by the explosive compound. In other cases a sudden wrench or strain, complicated or not with concussive force, may give rise to similar lesions in the spinal cord.

Here, again, he who carefully studies the anatomy of these parts will be compelled to acknowledge that great force, even of this sort, will be required to produce pathological changes in a healthy spinal cord. Observe the wonderful interlocking and bracing of these bony segments or vertebræ which form the spinal column. Behold the bony processes or projections thrown out in various directions from the bodies of the vertebræ to protect them from direct force! In addition to all this, contemplate the protection afforded by surrounding and covering these with heavy muscular cushions. It now becomes apparent to us that no trivial jar, twist or strain can result in any injury to the healthy cord; but, on the contrary, it is self-evident that an extraordinary force will be required to produce pathological changes in this centre, a power which can never fail to do serious injury to other organs which are not so well protected. This point is clearly brought out in my experimental work, where I made 141 experiments especially directed to the production of lesions in the cerebro-spinal axis, studiously avoiding, so far as possible, the production of injuries in other parts of the body. The traumatisms were carefully delivered on that part of the body where the greatest portion of the force would be expended on the spinal column; and what was the result? There were more than three times as many lesions produced in the other organs of the body as in the cerebro-spinal axis. The query suggested by these results is, that if severe traumatisms inflicted especially for the purpose of producing lesions in the spinal cord give us so small a ratio, how frequently might pathological changes be expected to occur in this centre in injuries arising from miscellaneous accidents? It is true that no reply approximating to a mathematical correctness can be here attempted; but it may be reasonably inferred that their occurrence will be very rare, even exceptional, unless the force applied has involved the continuity of the spinal column. In the examination of these accidents the surgeon's attention is first directed to the nature of the force employed, and, secondly, to that part of the body on which it was expended.

It is by careful attention to these factors that this search for lesions will be primarily directed.

Thus far we have only studied the effects of concussive force when applied to the nates and the posterior regions of the body. It therefore remains for us to consider the probable effects which arise from the application of concussive force on the other regions of the body. The statements already made while describing the effects of concussive force when applied to the nates are applicable, within certain limits, to the same force when it is applied to the feet while the lower extremities and body are maintained in a fixed and erect position. But even under these circumstances there would be a considerable loss of power, referable to the buffer action in connection with the articulations in the lower extremities.

However, a much more important subject for our contemplation in this connection is contained in the following question: Will not flexion occur at the articulations in the lower extremities with so much promptitude, under these circumstances, as to wholly obviate all danger? I think there is very little doubt on this point, and, therefore, feel strongly inclined to believe that no pathological changes can ever be produced in the spinal cord by concussive force applied to the feet. Furthermore, it may be boldly asserted, on the basis of correct anatomical knowledge and experimental research, that no amount of concussive force can ever be applied to the anterior or lateral regions of the body, which will be attended with the slightest danger to the spinal cord; since that amount of force which would disturb in the slightest degree the functions of the cord *could not fail* to destroy life by injury to some of the abdominal or thoracic organs on which the power of the blow must be primarily received.

Having completed our study of the so-called "concussion of the spinal cord," from an anatomical and experimental standpoint, I am thoroughly convinced that neither pathological lesions, nor even functional disturbances, are ever produced in this centre, in a healthy cord, without the application of very great force. It is foolishly absurd to presume that these morbid conditions can have their origin in a slight jar, wrench, or even the application of a moderate concussive force.

My distinguished predecessor, Dr. N. P. Dandridge, Chairman of this Section at the last meeting, gave us an elegant paper modestly entitled, "Surgical Interference in Fractures of the Spine;" but the principles enunciated in it are equally applicable to the treatment of nearly all spinal injuries. I cannot refrain, at this point, from citing a portion of this paper, on which my experimental experience seems to have a very important bearing. Dr. Dandridge informs us: "It is well known that not only a considerable number of these cases escape death, but entirely recover all their functions, even after the existence of paralysis, incontinence and bed sores, existing for a variable length of time. In a valuable paper Burrill has investigated the results of all the cases which have occurred in the Boston City Hospital, eighty-two cases in all, of which eighteen survived. Divided into regions, we find twenty-eight cases of fracture of the cervical vertebræ gave two recoveries; twelve cases of fracture of the upper dorsal vertebræ, six recoveries; nineteen cases of fracture of the lower dorsal, one recovery; twenty-three cases of fracture of the lumbar vertebræ, ten recoveries. Of the sixty-four fatal cases thirty-five died within five days, eight in from five to ten days, and seven in from ten days to one month. Five of these cases were submitted to operation, all of which were promptly fatal. In the eighteen who survived, the result was good in nine, and in nine complete disability remained permanent. The especial value of Burrill's paper is that it is based on the entire number of cases treated in a single institution, and gives, therefore, more reliable data for deductions than statistics made up of isolated cases."

The statement made in this quotation, that not only a considerable number of cases of fracture of the spine escape death, but actually recover after having developed grave symptoms, is certainly not in accordance with the old preconceived notion. It has long been urged by many distinguished surgeons, among others, Abercrombie, Sir Ashley Cooper, Sir Charles Bell and John Hunter, that even slight injuries of the spinal cord were very apt to lead to fatal terminations. Mr. Erichsen[1] has asserted, in this connection, that "in many of the cases in which sensation is more affected than motion, or in which the principal lesion consists in a modification of sensation coming on immediately after the receipt of a blow on the back, there may be reason to suspect laceration of the gray matter, with extravasation of blood into it. Hammond mentions two cases in which incurable paraplegia followed supposed spinal hæmorrhage. Speedy death, however, most usually occurs as a consequence of such an injury."

The same author has also added that "Boyer had long since noticed the very interesting practical fact that when the interspinous ligaments were ruptured, in consequence of forcible flexion of the spine forwards, no fatal consequences usually ensue, the integrity of the parts being restored by rest; but that when the ligamenta subflava are torn through and the arches separated, paraplegia and death ensue. This he attributes to stretching of the spinal cord." Sir C. Bell, however, with great acuteness, has pointed out the error of this explanation, and states that "it is the progress of inflammation to the spinal mar-

[1] "Concussion of the Spine, Nervous Shock, etc.," by John E. Erichsen, pp. 71 and 74. Wm. Wood & Co., New York, 1875.

row, and not the pressure or extension of it, which makes these cases of subluxation and breach of the tube fatal." . . . . "There can be no doubt that this explanation is the correct one, and that when once the spinal canal is forcibly torn open, fatal inflammation will spread to the meninges and to the medulla itself."

It will be observed that these quotations from Mr. Erichsen's work are not in harmony with the statements made by Dr. Dandridge. In fact we discover here about the same difference which marks the writings of the first half of this century on abdominal surgery, and those of the present day on the same subject. My own experimental studies have an important bearing on this matter of difference between Dr. Dandridge and Mr. Erichsen, and therefore I shall here state briefly some of my observations. Permit me, therefore, to transcribe from my brochure the following:

February 11. Experiment 4. Normal condition; mongrel, bull, male, æt. about five years; weight, 51½ pounds; temperature, 102.2°; pupils natural; traumatized. The animal walked with some difficulty, apparently weakened in the hind legs. Pupils were slightly dilated.

Feb. 12. Temperature, 102°; pupils normal; the symptoms more marked to-day than yesterday. The animal stood on his hind legs with much difficulty; walked with an unsteady gait; toilet neglected; eyes dull; ate and drank, and was evidently suffering from incomplete paraplegia.

Feb. 13. Temperature, 101°; pupils normal; some slight improvement in other respects.

Feb. 14. Temperature, 100.5°; pupils normal; ate and drank fairly well.

Feb. 15. Temperature, 101.8°; pupils normal.

Feb. 16. Temperature, 99°; pupils normal. There had been some improvement in the paraplegia.

Feb. 17. Temperature, 100.6°; pupils normal.

Feb. 18. Temperature, 100°; pupils normal.

Feb. 19. Temperature, 102°; pupils normal.

Feb. 20. Temperature, 100.7°; pupils normal.

Feb. 21. Temperature, 100°; pupils normal.

Feb. 22. Temperature, 101°; pupils normal.

Feb. 23. Temperature, 100.8°; pupils normal.

Feb. 24. Temperature, 101.6°; pupils normal.

Post mortem.—This autopsy was made promptly after the examination recorded on the 24th. There was found a simple fracture of the body of the last lumbar vertebra, external to which was a large blood clot, some part of which had evidently been absorbed, while the cauda equina showed signs of pressure from the coagulated blood, but none of an inflammatory character. There was also congestion of the cortical substance of both kidneys and the lining membrane of the bladder.

Microscopical report.—The brain was incised in several places, and it was found to be moderately hyperæmic; otherwise normal. There was general hyperæmia of the cord. The ganglionic cells were less distinct than in normal cords, less defined from their surroundings. The nerve ends were less sharply defined in the anterior and posterior columns, near the median commissure, than in the rest of the cord. This was more marked in the lumbar region.

Observations.—It is highly important to observe that in the case of this animal, the improvement was steady after the third day of the receipt of the traumatism until his death. In fact, so marked had been the progress, that I am fully assured, that had the dog been left to unaided nature, he would have entirely recovered. I will also add to the above record a few extracts from the same source, which will include *all the other cases* of fractures involving the spinal column which occurred in my 141 experiments. . .

First Series.—Experiment 3—traumatised—complete paraplegia. The hind legs absolutely powerless, but the animal drags himself, with much effort, over the floor with his fore legs.

Post-mortem.—This examination revealed a comminuted fracture of the spinous process and body of the seventh dorsal vertebra. The spinal cord was exposed, and found to be completely crushed at this point, showing the result, likewise, of inflammatory action in the congested and softened condition, which extended in both directions away from the seat of injury one inch or more.[1] . . .

Microscopical Report.—There was a break in the dorsal region of the cord. Above and below this break the cord was softened and intensely hyperæmic. The central canal was dilated with blood. The cord was intensely hyperæmic throughout. In the cervical and lower lumbar regions no special change was noticed except the hyperæmia.

Second Series.—Experiment 2. . . . Traumatised—Paraplegia. . . . Post-mortem.—This examination revealed the following: A simple fracture in the body of a vertebra, in the upper half of the lumbar region; the injury to the spinal cord was very marked at this point. There was likewise found within the peritoneal cavity about two ounces of coagulated blood directly over the psoas muscles; these muscles were ecchymosed, the right more than the left. Both kidneys were congested. Meninges of the brain congested, especially over the occipital region; spinal cord in a similar condition. . . .

Microscopical Report.—Brain intensely hyperæmic otherwise normal. The cord was hyperæmic throughout. It had not hardened well,

[1] The above record will, it is thought, enable the reader to form his own opinion in regard to the causation in these cases, while the whole number interrogated is limited to six. The total number which terminated quickly in death were eight, while there were only four of these, in which there were found any lesions in the cerebro-spinal axis. See brochure, page 71, for complicating lesions.

and the outlines of the fibres were indistinct, whether cut longitudinally or transversely. The ganglionic cells were perfectly distinct.

Experiment 5.—Traumatised—Incomplete paraplegia; pupils moderately dilated. Post-mortem.—This examination revealed the following lesions: Congestion of both kidneys; in the pelvic cavity there was a quantity of extravasated blood, a deep ecchymosis involving the whole of the left psoas muscle, marked congestion of the meninges covering the vertex of the brain, and a slight congestion over other portions, the brain itself somewhat hyperæmic, cranial fluid increased in quantity. The spinal cord was likewise hyperæmic. A comminuted fracture of the body of the last lumbar vertebra and the presence of a blood clot within the canal at this point. . . .

Microscopical Report.—"The material was not received." The injuries described in Experiment 3, First Series, would have sooner or later caused the death of the animal; but in the other cases recovery would have been the final termination in each instance. It would be very interesting in this connection to take up separately the eleven experiments in which there was a rupture of vertebral ligaments, in order to show the nature of the pathological lesions in each case, and likewise the other complications; but space will not permit; and therefore it is sufficient for me to say, that in each instance the improvement had been so marked before the animal was killed, as to justify me in asserting, that all of these animals would ultimately have recovered.

There still remains a single point connected with fractures and other lesions of the spinal column, to which I desire to call especially the attention of surgeons. My experimental studies have conclusively shown that in all severe injuries of the spinal column, cord, etc., there are complications involving more or less seriously, the organs within the thoracic, abdominal or pelvic cavities. I know of no reason why there should not be found similar complications in the human subject. In fact, I think it will be discovered when sought for in connection with spinal lesions.

EXPLANATORY NOTES AND REFERENCES.—A brochure entitled "An Experimental Study of Lesions Arising from Severe Concussions," by R. A. Watson, M.D., p. 67 *et seq.* Philadelphia: P. Blakiston, Son & Co.: The report of these cases may be found by a reference to Nos. 20, 22 and 35, First Series, and No. 64, Second Series. The immediate cause of death in case "No. 20 was a rupture of the aorta." . . . In 22 it was "chiefly due to deep lacerations in the lungs, injury of the liver, etc."

"The cause of death in the 35th experiment existed in the rupture of the right auricle and left pulmonary artery." "In the 64th Experiment the cause of death was the laceration of the liver, which gave rise to a profuse hæmorrhage, although there were hæmorrhagic infarctions in the lungs and a pre-existing pneumonia." . . . "The spinal and brain complications in the above-mentioned cases were as follows: In Experiment 22 there was intense hyperæmia of the brain and spinal cord, while in the 20th and 35th Experiments there were found small hæmorrhages into the gray matter of the cord. The complication in the 64th Experiment consisted of distension of the vessels of the membranes of the spinal cord, which had ruptured in several places, and hæmorrhages of small size had occurred in the surrounding tissue."

MEDICAL PROGRESS.

THE CONFLICT WITH PULMONARY TUBERCULOSIS.—In a paper read before a medical society of St. Petersburg, DR. MAX SCHMIDT describes all the modern methods employed in the treatment of tuberculosis, including Weigert's inhalations of hot air. He concludes that nearly all these remedies are inefficacious because they cannot be applied in sufficient strength without injury to the patient, or because they fail to penetrate the tissues sufficiently to reach the bacilli. It remains for phthisical subjects then to content themselves with caring for their health by means of the inhalation of relatively pure air, free from dust, by good strengthening nourishment, and by strict attention to the hygiene of the body. The author agrees entirely with Cornet regarding the etiology of the disease.

RENAL COMPLICATIONS IN WHOOPING-COUGH.—Some time ago DR. STEFANO MIRCOLO, in *London Med. Recorder*, pointed out that he had several times observed renal complications in whooping-cough. Thus, on one occasion, among ten children suffering from the disease, nephritis occurred in two cases, one of which died. The necropsy left no doubt as to the existence of the renal affection. During another outbreak, among thirty-seven cases nephritis developed in four. Two of these died, and in one a post-mortem examination was made. The kidneys were examined microscopically, and were seen to be in a

These forty-six cases of pathological changes involving the various parts of the cerebro-spinal axis occurred as follows: (1) brain, 1; (2) brain and spinal cord, 12; (3) spinal cord, 15; (4) cauda equina, 2; (5) membranes of the brain and spinal cord, 3; (6) Brain and spinal cord? 2; (7) brain and cauda equina? 1; (8) spinal cord? 2; (9) brain? 1; (10) spinal cord and the membranes of the brain, 5; (11) membranes of the spinal cord? 1; (12) membranes of the brain and spinal cord? 1.

The attention of the reader is here called to the fact that in my brochure I have stated that there were fifty cases in which pathological changes occurred in the cerebro-spinal axis, but a more careful examination of these reports justify me in limiting the number to forty-six.

² It will likewise be observed in the above classification of these pathological changes that in some instances the interrogation point has been placed after the classification clause. In the cases thus marked the author thinks there is a reasonable doubt whether the pathological changes observed were due to the traumatism or other complicating factors. Thus, in Experiment 10, First Series, the following facts are recorded: Post mortem.—"Visceral organs of the thorax and abdomen healthy, with the exception of the kidneys, which are both in a state of cystic degeneration. The meninges of the brain seem to be congested. The quantity of cerebral fluid apparently somewhat increased. No softening (apparent to the unaided eye) of the brain and spinal cord. . . .

Microscopical Report.—Brain moderately congested. There are a few punctate hæmorrhages in the anterior horns of the lumbar region of the cord. The cord is hyperæmic throughout, but less so than in Experiment 22." The record in the 17th Experiment, Second Series, reads as follows: Post mortem.—"This examination revealed the following lesions: Rupture of the bladder, abdominal cavity distended with urine, the organs contained within it all more or less inflamed, lungs contained numerous hæmorrhagic infarctions and were considerably inflamed. The meninges of the brain were markedly congested, blood clot of considerable size beneath the dura mater, spinal cord seemed congested. . . ."

Microscopical Report.—"The brain is intensely hyperæmic; there is no lesion of the nerve cells or fibers. There are hæmorrhages in the meshes of the fibrous tissue of the dura mater and upon its inner surface. The vessels of the cord are very greatly distended with blood, but there are no hæmorrhages and no lesions that can be distinguished in the ordinarily stained sections."

condition of severe parenchymatous nephritis. No microörganisms could be seen. Recently Dr. Mircolo has brought forward additional evidence on the subject. In a recent epidemic at Monterrubbiano, of twenty-four patients, three died—one from suppression of urine, another from suffocation in a paroxysm of coughing, and a third from marasmus. In the two latter cases, although during life there were no symptoms of renal affection, on post-mortem venous stasis in the kidneys with commencing albuminuria was found. There was also a considerable amount of hæmorrhagic infiltration. Cultures of the kidney tissues gave negative results. Dr. Mircoli believes that the renal affection is due to venous stasis caused by obstruction of the vena cava through the violent paroxysms of coughing. According to him the kidney is affected, in whooping-cough, in 12 per cent. of cases occurring in children.—*Archives of Gynecology.*

Antipyresis.—Dr. Riess, of Berlin, believes that the antipyretic treatment of infection fever is the best method at our disposal. The neglect of this treatment in German practice during recent years has arisen rather from theoretical objections to its use than from practical experience. Certain views regarding the etiology of various infective diseases which have been derived from bacteriological study and which *a priori* oppose antipyretic treatment rest, in reality, upon an unsubstantial basis. Thus, the teaching that the rise of temperature from fever is a beneficent reaction of the organism against the morbific agent, finds only slight support in the investigations which have hitherto been made concerning the biological properties of the pathogenic microörganisms. Opposed to these are the well known experiments made thirty years ago regarding the favorable influence of antipyretic methods of treatment, such as the cold water treatment of typhoid fever. The author makes mention of the method which he has employed for many years with excellent results, *i. e.*, the permanent or protracted employment of tepid baths. The application of these is very simple. A temperature of 31° is suitable for the bath. When the bodily temperature falls to 37.5° or lower the patient is removed from the bath; if it rises above 38.5° he is again placed in the bath. If the temperature falls too slowly in the bath an occasional moderate dose of an antipyretic is given internally. In this manner the writer has treated over 1,000 cases of fever (inclusive of 809 cases of typhoid) in the Friedrichshain Hospital of Berlin. The author refers in detail to the most satisfactory experience which he has had in the use of the permanent tepid bath. By this method it is an easy matter to reduce the temperature and keep it at nearly the normal. The permanent baths are only required, as a rule, during the first few days, after which their duration is shortened until finally only a short evening bath is required. The mortality in this method has been 8.5 per cent., which corresponds to the lowest figures obtainable in the larger hospitals of Berlin. The average duration of the disease is shortened, the course is milder, the cerebral disturbances are surprisingly modified, complications and sequelæ are less numerous, relapses occurred in only 2.6 per cent. of the cases and were generally of a light character. Other acute diseases are also amenable to this method of treatment. The author believes that until we can find some causal antipyretic therapy for the diseases of infection, we must retain the symptomic method of treatment, to abandon which would be a most decided mistake.—*Wien. Med. Woch.*

The Physiological Action of Caffeine.—Messrs. Sée and Lapicque have formulated the following conclusions as the result of their study of the action of caffeine:

1. Caffeine in small repeated doses amounting to 60 centigrams per day may be advantageously prescribed to soldiers on the march, as it increases muscular action and promotes the activity of the motor nervous system, both cerebral and medullary. The result of this double action is to diminish the sensation of effort and to prevent fatigue.

2. It prevents shortness of breath, with resultant palpitation.

3. In this manner it supplies vigor to one who is engaged in severe and prolonged exercise.

4. By producing this excitement of the cerebrospinal motor system, upon which the increase of muscular tonicity depends, caffeine increases the consumption of carbon in the organism, and especially in the muscles, but does not diminish the loss of the nitrogenous elements, and is not an economizing agent.

5. Economy in general cannot be effected, in the case of the higher animals, in a complete manner, so as to prevent the disagreeable effects of fasting, except under conditions which cannot be realized—inaction or immobility. With caffeine the very opposite is observed; that is to say, stimulation that can only be maintained at the expense of the organism. It is by increasing combustion that caffeine promotes muscular activity.

6. Caffeine possesses no mysterious properties that enable it to replace food; it only substitutes the general tonic excitation that is produced by the ingestion of food. If, indeed, we admit that it is the immediate action of food that stimulates the stomach and nervous system, and that the immediate alimentary value of food is nothing, we could substitute one stimulant for another. Caffeine, far from economizing the reserve forces, cannot enable the exhausted subject to resume

his labors only by attacking those reserves whose destruction it hastens by excitation of the nervous system; through it the muscles, then the organism, quickly loses its nutritive stock, and caffeine cannot prevent it.

7. The immediate action of caffeine upon the heart and vessels appears to be quite different from what it is generally supposed to be. We are at present studying the whole xanthic series. We know from the investigations of Gauthier that this series comprises paraxanthine, theobromine and caffeine, the latter being merely methyltheobromine or trimethylxanthine. It is important to compare caffeine with theobromine before judging their relative cardiac and diuretic action.—*L'Union Méd.*

CURETTING OF THE UTERUS.—DR. SABAIL, in *Jour. de Méd.* Curetting and écuvillonage combined constitute an inoffensive operative procedure if strict antiseptic precautions are observed before, during, and after the operation. The author's experience of seventy cases has been unattended with accidents due to the surgical measures. The operation may be performed by any general practitioner of moderate skill. Recent circumuterine inflammation contraindicates its performance. In sixty of the cases the morbid condition was a result of labor or abortion, in four there was gonorrhœa, and in six interstitial fibroma or cancer. Of the gonorrhœal cases, two were complicated by oöphoro-salpingitis. As a means of diagnosis, curetting has been shown to be of great value. In fifty-five cases the operation resulted in a cure, and was followed by pregnancy in six in which sterility had previously existed. Perimetritis followed two of the operations. In two of the cancer cases the patients have remained in fair health for two or three years, the curetting being performed at suitable intervals. In the case of interstitial fibroma hæmorrhage recurred within a short time after the curetting. —*Arch. Gyn., Obstet. and Pæd.*

INOCULATION OF LUPUS.—At the weekly clinical conference of the physicians of the Hôpital St. Louis, M. A. TROUSSEAU presented (*Annales de Dermatologie et de Syphilographie*, September, 1889) two rabbits, into the eyes of which he had successfully inoculated some particles of lupus coming from the conjunctiva of a young woman. Upon the one rabbit an aseptic puncture was made at the margin of the cornea with a triangular knife, and through this opening a small particle of lupus tissue was introduced into the anterior chamber, just at the centre of the pupil, by means of a slender silver spatula; hernia of the iris being avoided by the instillation of eserine. There was no inflammatory reaction, the nodule gradually diminished in size, and eight days after its introduction was totally absorbed. During the ten days following nothing was noticeable. On the twelfth day following its complete absorption there could be seen a peculiar swelling, apparently a folding of the iris. Upon its surface there appeared some small white points which increased both in number and size, and assumed the aspect of true nodules. At the time of presentation of the animal the anterior chamber was filled with these yellowish deposits, some minute, others as large as peas.

In the other rabbit the inoculation was made into the corneal laminæ, and after eight or ten days was completely absorbed without any reactionary irritation. Fifteen days later a grayish point appeared in the cornea which increased in size, forming a yellowish tumor, elevating the anterior laminæ of the cornea. Bacilli were found. —*Amer. Jour. Med. Sciences.*

THE ETIOLOGY OF PARAMETRITIS. — BUMM (*Archiv für Gynäkologie*, Bd. XXXV, Heft 3) has made some important observations with the view of determining the true cause of so-called cellulitis. When pus is present it is much easier to decide this question than in the case of a simple serous exudation.

Cellulitis is usually divided into the infectious and the traumatic varieties, but the writer punctured a supposed traumatic exudation in five cases, two of which he found to be of gonorrhœal origin, while the fluid from the other three contained streptococci. Parametritis was induced artificially in rabbits, and in every instance streptococci were found in the exudation, even when there was no pus; hence the legitimate inference that *there is no purely traumatic cellulitis*. Whenever streptococci are present *there must be infection from without*; they are never found in the healthy genital secretions. Auto-infection is extremely improbable.

[The extreme importance of this unassuming paper is not at first appreciated. If the writer's deductions are correct, he has at length thrown some light upon a subject in which there has been more theorizing than on any other in the whole range of medicine—the nature and origin of pelvic cellulitis. As the result of his studies he reaches the same conclusion as many thoughtful gynecologists, that old indurations in the broad ligaments are in themselves comparatively harmless, and that the danger of exciting fresh inflammation in them by operating on the cervix uteri has been much exaggerated. As Bumm shows, where inflammation arises in the pelvic cellular tissue it is directly attributable, not to the operation, but to the operator—to *infection*, not to *traumatism*. Positive scientific facts like this accomplish more for the progress of gynecology than do the most plausible theories.—ED.] —Henry C. Coe, in *Amer. Jour. Med. Sciences.*

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FOR THE GOOD NAME OF MEDICINE.

In some remarks before a State Medical Society recently, a very well known literary man spoke in any thing but flattering terms of the scientific position of medicine. This sentiment is echoed in the public press and in drawing-room conversation. Medicine certainly is at the bar of public opinion. A crowd of ragged, emaciated and ghostly claimants demand the division of the estate, and they are each and all supported by a blatant and venal press and a lobby of ignorance, superstition and sentiment. The dignity and honor of medicine in our country is greatly abridged.

The fact that medicine broke loose from the alchemy and sorcery of the middle ages sufficiently explains the tendency of immature and unbalanced minds to revert to these ancestral types. History and poetry surround such examples of arrested mental development with the glamor of sentiment or the sophistry of antiquity, and the delusions of an emancipated sex furnish the necessary pabulum for daily subsistance.

The age of religious discussion and dissention has left its traces in the topography of our profession and especially in the minds of the common people. But at the beginning of the eighteenth century the impulse of great scientific awakening found its strongest ally in medicine. From its earliest beginnings physicians were almost universally devoted to the study of one or another of the sciences. In every department the most valuable contributions both in quantity and quality have been and are made by doctors of medicine. They are the result of labors carried on usually in the short intervals of leisure in professional duties. It is in the highest degree irrational to presume that the contributions which such men made at the same time to medicine were unscientific and empyrical. The methods which they used in their recreative studies were not only applicable to, but they were fully utilized in the study of medicine, as any one familiar with the subject will admit. The accusation that medicine is unscientific, narrow and bigoted, is denied by the most cursory review of our literature. That literature was, until the last thirty years, the principal storehouse of each of the natural sciences. The literature of almost every one of our various *ologies* from physics to psychology runs back for its wellspring to the archives of medicine, and each one of them finds its patrons and abettors to-day in the ranks of our profession. Medicine is a department of science which embraces and combines under one administration a large part of the provinces of biology, chemistry and sociology.

No other profession possesses such a literature as medicine. The literature of law is not small, but the bulk of it is prepared by paid officials, and is essential to the action of every superior court. The literature of theology is also the natural crystalization of the routine work of the clergy. But medicine has no rewards for its writers, and the original researches and experiments upon which the mass of it is based is not essential to the prosecution of professional work.

That medicine is not, from the nature of the case, a pure science, stands without saying. Its approximations correspond well with the complexity of its data, and especially with the complexity of the relations of that data. In medicine these relations reach their highest degree of complexity. Medicine is the focus of scientific thought and energy. Nor is medicine in our own land less representative and less purely scientific than elsewhere in the world. Although our age and our freedom from precedent has encouraged many absurd departures, in no other department of science, art or literature are Americans more respected and honored the world over. Among no other thinkers, actors and writers have we more illustrious citizens.

To assert that medicine is not to-day and in

these United States the most scientific of the professions, is to voice a depth of ignorance of what science and medicine are, which is incompatible with an unprejudiced and enquiring mind.

"ORIGINAL" WORK AND THE AMERICAN MEDICAL ASSOCIATION.

The wonderful strides made by the medical profession of this country in the last few years, are only equaled by the industrial and commercial progress everywhere manifest. In the early days, when the profession was engaged in battling with epidemic diseases, riding many miles to see a few scattered patients in sparsely settled neighborhoods, it was the so-called practical man that was needed—the man who wielded calomel and quinine rather than the test-tube and microscope. Now all this is changed. With increasing wealth and a denser population have come opportunities for other work. All over our land science schools and laboratories are springing up, filled with earnest workers, each striving to add his contribution, meagre though it be, to the sum of human knowledge.

It is to this class of patient workers that modern medicine owes so much, and for the encouragement of which every effort should be made. To a certain extent this is accomplished by endowments of educational institutions and laboratories, in other cases by offering prizes, but this latter plan has not been eminently successful. These efforts point to the fact that the value of this kind of work is recognized, and also that for the worker there is but an inadequate return for the time and money expended.

As at present organized, the Section work of the Association has but little room for the experimental pathologist or therapeutist. The work is largely confined to the consideration of practical matters, those which belong directly to the practice of medicine. To illustrate: one might present to the Section on Practice a valuable and useful paper upon the chemical examination of the blood, which would be well received and ably discussed, and yet the paper might not contain a single original idea. That same individual might have made some valuable observations upon the blood corpuscles of the lower animals or upon the chemistry of blood; these facts while standing alone are valueless, and for the clinician are so much useless scientific lumber.

But it is this kind of work that is rapidly raising the practice of medicine to the realm of an exact science, for every once in a while the great generalizer comes along who weaves these scattered fragments into a grand whole, deduces the law, and science has again advanced. The Association should recognize its lofty mission and grow as the profession grows, and now seems a fitting time for the special recognition of the experimental worker, either by the creation of a special Section, or by such other means as may seem desirable. THE JOURNAL is able to give wide publicity to this kind of work, more than it now receives, for much of it is practically buried in reports of laboratories and other occasional publications.

THE CREMATION OF THE INSANE.

Most of our readers, it is to be hoped, are acquainted with CHARLES LAMB'S "Dissertation on Roast Pig," and will remember the account he gives of the origin of that savory dish in the accidental burning of a Chinaman's dwelling, in which, as in later times was the custom in the Emerald Isle, quadrupeds and bipeds shared together the comforts of a home. In consequence of this accidental discovery, conflagrations became surprisingly frequent, and rates of insurance in the Flowery Kingdom rose to an alarming figure, until in the lapse of ages, it occurred to some genius that the same end could be attained by cheaper means, and the differentiation of the dwelling-house and the culinary fire was accomplished. It may, perhaps, be worth while to consider whether the time is not ripe for a similar division in the arrangements for the disposal of a class of the population which makes, every year, heavier demands on the attention alike of the philanthropist, and the tax-payer. Among the various plans which have been tried, none of which, apparently, has given universal satisfaction, that of cremation, if we may judge by the extent to which it is practiced, is growing in favor, and in this direction, as might be expected, the New World leads the van. A German physician, DR. LAEHR, has recently written a book on the history of psychiatry, in which among other things, he furnishes statistics in regard to conflagrations in asylums for the insane. From the information collected by him it appears that, at the time at which he wrote,

there had been, in the United States, eight such fires attended with loss of life. In six of them, 114 lives were lost, and in two the numbers were not stated. In Canada, also, there had been a fire, with loss of twenty-six lives. In the Old World, on the other hand, he only found accounts of the loss of seventy-odd lives, in eleven fires. In England, for instance, there had been several lives—number not stated—lost in one fire; in France, ten lives in three fires, and in Germany four lives in two fires. Recent events, fresh in the minds of all our readers, have greatly increased this disparity, and we may now fearlessly boast that, during the present century, more than twice as many insane persons have been burned alive in the United States and Canada as in the remainder of the civilized world. It is to be hoped that the American alienists who attend the coming International Medical Congress will not fail to call attention to this fact, which is, in itself, a sufficient refutation of the charge sometimes made that they are behind the times.

Gratifying, as have been the results attained, it must, nevertheless, be admitted that there is room for improvement in the means employed. It would seem that sufficient experience has now been accumulated to demonstrate that the same building will not satisfactorily answer at once the purpose of a crematory and a hospital. For the former purpose the institutions at Longue Point and Chenango seem, it is true, to have been fairly efficient, but they can hardly be recommended on the score of cheapness, while such usefulness as they had for hospital purposes is now at an end. We therefore venture to suggest that, in the future, separate structures, or at least separate departments be provided for the two purposes, so that there need be no waste of fuel in cremation, and that such insane persons, if any, as shall be thought adapted to hospital treatment need not be, from time to time, deprived of shelter. The statistics above given seem to indicate a possibility of learning something, in the latter direction, from the effete despotisms of the Old World.

SPECIALISM IN NURSING.

The Lancet considers the point of the desirability of differentiating the work of nursing into varieties more or less numerous. The subject was brought into recent notice by a discussion at the British Nurses Association, when it became evident that opinion was greatly divided on the question. *The Lancet*, however, has clear views in opposition to a multiplying of distinctions in this field of work, and quotes with favorable comments the argument of MR. WARRINGTON HAWARD, presented before that Association at a meeting held in April. The training of nurses, he argued, should in all instances begin upon a basis of a sound general instruction, regardless of what, or any, superadded instruction in special departments. Excessive specialism, if it has injured medicine at all, has wrought its evils in practice rather than in training. "All 'round" is still the fundamental maxim of professional instruction, and "all 'round" should remain the precept in nursing. To induct those who are preparing to nurse the sick into a specialty, without first instilling correct general principles, is comparable to an ornate structure on a flimsy foundation. There is no need of denying that nursing requisites exist, especially in the case of the after-care of the major operations, for which the profession must employ persons of special aptitudes, but in their cases, not less than in those whose responsibilities are not so weighty, the necessary basis of thorough preliminary training should be held to be quite as important as that after-development which is fostered and patently matured in the chosen few who manifest the capacity and liking for work in special fields. Any specialism in nursing that comes about in this thorough and painstaking way is both welcome and highly prized.

EDITORIAL NOTES.

A NEW SECTION.—In connection with the report of the Committee on Dietetics a resolution presented at the General Session of the Association on Thursday, May 22, was adopted, by which a new Section was created and designated "The Section on Dietetics and Physiology."

THE PLATFORM CLEARED.—By resolution it was decided that in future the business of the General Sessions should be conducted solely upon the floor of the house. We incline to believe that this is a wise provision. In the excitement which is often incident to a running debate, position may have materially to do with the power of

a speaker to influence his hearers. Under such circumstances it is but just that all should be required to meet upon a common plane. Henceforth the Presiding officer, the Secretary, and possibly the Chairman of the Committee of Arrangements are to be heard from the platform, but all others are to be limited to the floor.

A MERITED VOTE OF THANKS.—The amount of correspondence which this year has fallen to the lot of our worthy secretary, Dr. Wm. B. Atkinson, in connection with the meeting at Nashville and the Congress at Berlin, has been simply enormous. He is to be congratulated for the successful manner in which this voluntary and onerous work has been accomplished, and the least that the Association in justice, could do, was to honor him with a unanimous vote of thanks.

HYPNOTISM IN BELGIUM MADE A MISDEMEANOR.—The Academy of Medicine of Brussels having memorialized the Belgian Government in condemnation of all public hypnotic exhibitions, a regulation has been adopted forbidding them. The only uses of hypnotism hereafter legally to be practiced will be medical and therapeutical. The practice of hypnosis on girls under the age of 18 years is made punishable by fine and imprisonment.

THE CORRECTION OF AN EVIL.—It coming to the knowledge of the Association that medical men were in the habit of attending its sessions and participating in its proceedings without having registered, and without paying their annual dues, a resolution was adopted directing that cards be prepared and issued at the place of registration, and that members be admitted only by card to the meetings of the Association, during the first two days of its annual meetings.

TIMELY AND GENEROUS BEQUESTS.—If capital shall serve the cause of the poor and the needy, as in the following instances, surely labor will have less cause for conflict or for complaint as the purposes of capitalists are better known.

The late George S. Pepper, of Philadelphia, by his munificent bestowments has rendered nearly every charitable institution in that city a debtor to his memory. Over half a million of dollars are left to the various hospitals for the relief of suffering and for the care of the sick poor. The name of George S. Pepper will long be held in grateful remembrance by his fellow citizens, and especially by those who in the hour of sorest need shall find in him their benefactor.

By the will of the late Segwald A. Quale, of Eau Claire, one million dollars is to be devoted to the founding and maintenance of a hospital for cripples and deformed persons in the city of Madison, Wis. Of such men as these it may well be said their charities ally them to immortality.

THE NASHVILLE MEETING AND THE NASHVILLE PRESS.—The annual meeting at Nashville was all the more enjoyable by reason of the active and able coöperation of the daily papers of that city. To the *Daily American* we are specially indebted for its full and remarkably correct reports of the meetings. Its final words are these:

THE DEPARTED DOCTORS.

The doctors, after a stay in our city enjoyable alike to citizens and guests, have gone away to their many homes. No gathering which ever took place in Nashville has to such an extent won the interest and high respect of our people, and whenever the members of the very learned profession desire again to turn their collective faces southward, the people of Nashville and of Tennessee will open even wider the doors of hearts and homes and give them cordial welcome.

PROGRESS OF CREMATION.—The number of cremations increases every year. In London, from 1884–1887, there was an average of only eight per year. In 1888 there were twenty-six, and in 1889 forty-six. During the present year there have been several each week. In the new Paris crematory there were only thirty-five voluntary cremations in 1889, but the number of dead-born children and cadavers from the hospitals and schools is so great that cremation goes on day and night without intermission. According to the *Journal d' Hygiène* 3,000 bodies were cremated in 1889. In Rome there were 119 cremations in 1886, 155 in 1887, and 202 in 1888.

NEW SYSTEM OF SEWERAGE IN NAPLES.—The *Revista Internazionale de Hygiene* gives an account of the new system of sewerage in Naples. The total length of the sewers is 76,000 metres, of which about half, or 35,700 metres, is quite new. The fall of the principal sewers does not exceed 5 in 1,000.

DR. CHAS. CHASSAIGNAC has been elected to the presidency of the New Orleans Medical Society, to succeed the late Dr. John P. Davidson.

TOPICS OF THE WEEK.

AMERICAN vs. FOREIGN PHYSICIANS.

I believe in some forms of protection, and, in my opinion, the American physician should be protected. Holders of foreign diplomas who come to America, should not be allowed any greater privileges than are accorded abroad to American physicians. The University of Berlin has recently refused to recognize any diplomas from United States medical colleges, and it has been announced that an American physician desiring to practice medicine in Prussia, must first take a regular course in a German College. "The French Minister of Public Instruction has declared officially that hereafter foreign doctors shall submit their diplomas to the judgment of the French faculties, which would then decide whether they were on a parity with those granted to French practitioners. Furthermore, foreign medical men should be required to undergo the final examinations to which French candidates for the qualification to practice have to submit themselves." One-sixth of the physicians in California are from foreign lands, and graduates of foreign schools, and I would like to see the next Legislature provide for an Examining Board, no member of which should belong to the faculty of a California college, whose duty it would be to require each person who applied for a license, with a foreign diploma as his credential, to pass an examination equivalent to the final examinations of our California medical colleges.—Dr. Walter Lindley, *Occidental Medical Times.*

IODOFORM EMULSION IN COLD ABSCESSES.

A recent number of the *Wiener klinische Wochenschrift* contains a paper by Professor Billroth on the treatment of cold abscesses and tuberculous caries. He says Mosetig v. Moorhof was the first to recommend iodoform as a local antiseptic and an anti-tuberculous remedy. Since 1881 Billroth himself has made an extensive use of the iodoform emulsion. The parenchymatous injections of such solutions, and the injections of them into abscesses, caused such severe and persistent pain that this method was soon abandoned in his clinic. The formula of the iodoform emulsion, as used by v. Moorhof, was first: B. Iodoform pur. 10.0; ol. ricini. ol. amygdalæ ää 15.0. The first formula used by Mikulicz was: B. Iodof. pur. 10.0; glycer. 80.0; oil of olives 40.0. Later on Moorhof recommended the following formula: B. Iodof. pur 50.0 tere c. glycer. 40.0; distilled water 10.0; gummi traganth., 0.30. The formula used by Mikulicz in Billroth's clinic differed from v. Moorhof's in that the latter contained considerably more iodoform than the former. As the addition of oil seemed to Billroth to be useless, he had only 10 grams of pulverized iodoform mixed with 100 grams of glycerine; the mixture had to be violently shaken before it was used. This emulsion could not, of course, be employed for parenchymatous injections. In 1881 Mikulicz reported two cases in the *Berliner klin. Wochenschrift*, in which he had injected the emulsion into cold abscesses of the thigh after opening them. There was considerable diminution of the abscess cavity after some weeks. Professor Billroth himself tried this method, and in 1884 the results were published by Fränkel. Of 20 cases, 18 were definitely cured, but in the other 2 the treatment was not successful. Professor Bruns, of Tübingen, also obtained very satisfactory results by this method. The anti-tuberculous influence of iodoform was clearly proved by these experiments, and if the effect of the powder when applied to carious foci was not so satisfactory, that was no doubt due to its not being long enough in contact with all parts of the walls of the abscess cavities and the bones. The emulsion, therefore, was clearly preferable in such cases. The results of this plan have exceeded Professor Billroth's most sanguine expectations, except in some abscesses taking origin from the vertebral column, in which the treatment seemed to be too dangerous to be tried. This method was practiced on almost all the bones, joints, and soft parts of the body, and in nearly all these cases results were obtained far surpassing all previous experience. The *technique* of the treatment is as follows: When operating upon the extremities Esmarch's bandage must be applied; when the cavity has been emptied it should be taken off. The cavity is then stuffed with iodoform gauze, and after all bleeding has ceased—it may last from half an hour to three-quarters of an hour—the emulsion is poured in and the wound stitched up. In this, as in all other operations, Professor Billroth insists on the most scrupulous antiseptic precautions; the skin must be washed with alcohol, ether, and sublimate, and the silk sutures must be completely sterilized. An incision is made through the skin and the soft parts over the abscess along the long diameter of the swelling. Incisions from the tuber ischii to the popliteal space, or from the latter to the heel, are not uncommon in these operations. A large pledget of iodoform gauze is then pushed into the abscess, and its inner surface firmly rubbed. The cavity is then washed with a 1 in 3,000 solution of sublimate. If there is a cavity in the bone this is energetically cleansed. The wound is next stitched up, except a large opening through which the emulsion is poured into the cavity of the abscess and the cavity of the bone respectively. Finally, the rest of the wound is closed with sutures, and the dressing applied. In most cases fever, lasting from three to four days, supervenes, and occasionally also there is rather high evening temperatures. The following types of cases are met with: 1. No pain, only some passing twinges following the operation; fever moderate. Under these conditions the dressing can be allowed to remain from two to three weeks. Recovery takes place by first intention. The sutures are then removed, and the dressing allowed to remain for about two weeks longer. 2. Sharp pain and severe fever. The dressing is taken off; bloody serum mixed with iodoform emulsion escapes from some parts between the sutures. The serum is pressed out; the sutures are allowed to remain, and slender drainage tubes are introduced into the openings. A new dressing is applied, which is removed after from three to seven days. When the discharge stops, the drainage tubes are removed. Healing by first intention takes place in the deep parts; the granulating

wound is dressed with an ointment; the small fistulæ are touched with nitrate of silver, and thus are soon closed. This is the most common course of events. 3. Pain increases on the second and third days after operation. Pure blood or bloody serum escapes from the wound; drainage and fresh dressing. Recovery without suppuration may occur even in these cases. 4. Stitches burst owing to great tension, and decomposition owing to streptococcus albus around the sutures. Treatment as above. 5. Continual fever and pain. Pus escapes from between the sutures. In this case the operation has not been really successful; cocci of suppuration have remained behind. The stitches are removed, drainage tubes inserted, and pure glycerine or iodoform emulsion poured in every second day. This, in most cases, causes pain and fever. Recovery takes place in from five to six weeks. 6. If after this time no sure signs of definite recovery are present, the operation must be repeated. The worst cases of very large abscesses and numerous fistulæ gave in Billroth's hands the best results, not merely proportionately but absolutely.—Vienna Cor. *British Medical Journal.*

DISPOSAL OF SEWAGE AND GARBAGE.

The subject of the pollution of sewage is one of growing importance as the population of our cities and towns increases, for these streams must more and more be the dependence of the people for household uses. The greatest harm resulting from sewage in streams is the pollution of the water for domestic purposes. But there are other evils, such as the destruction of fish, and the gradual obstruction of their channels. The principal rivers of the State flow through so many counties, that it is impracticable to find a solution of the problem in the action of local authorities, either separate or concerted, and in the near future our State Legislature must devise a general plan to stop the mischief. The impurities which now go to our streams are mainly the contents of the sewers, and partially the solid garbage hauled from premises. In cities along the coast, sewage flows into the sea with little regard to the ebb or flow of tide, and much of it is cast back upon the shore. It is therefore desirable to discharge during the ebb only. Many European towns are disposing of their sewage by irrigation with advantage, and in some cases even with a slight profit. For agricultural purposes, one acre of land is considered sufficient to dispose of the sewage of 100 persons. If the land be used for purification only, much less acreage will suffice. The charge of insalubrity against sewage farming is not sustained. Analysis of well water on these lands shows no organic impurity, demonstrating the thorough filtration of the water, with combined oxidation by the ground air, and appropriation of the matters in solution by the growing vegetation. Observation has not shown typhoid fever or diarrhœal complaints to be more prevalent on such lands. Bad management and neglect of under-drainage are responsible for most of the complaints made against this system. The disposal of garbage by cremation or by dessication has been found practicable, and comparatively inexpensive. Many of these crematories are in successful operation; the cost of the Mann furnace, at Montreal, is 25 cents a ton of ordinary refuse, and 75 cents for night soil. The Engle destructor in use at Des Moines and Minneapolis disposes of refuse largely composed of carcasses, for less than 20 cents a ton. The Shaw crematory in London, Eng., dries the refuse, which is then fed into the furnaces, so that when once started it becomes self-operating. The residue, amounting to about one-sixth of the original, is ground up for mortar, and a preliminary sorting of the refuse permits the saving of many substances, as iron, glass, rags, etc. Sufficient heat is developed to run a small steam engine used in connection with the furnace. —*Occidental Med. Times.*

ICHTHYOL IN GYNECOLOGY.

Dr. Freund, first assistant in the gynecological clinic at Strassburg, has found ichthyol of considerable use in parametritis, perimetritis with effusion, cicatrization of the vagina and os, chronic metritis, inflammations of the ovaries and Fallopian tubes, ulceration of the os and pruritus vulvæ. He uses the drug internally in the form of pills, and externally as a 5 per cent. solution in glycerine applied on cotton wool; also with lanolin as an application to the abdominal walls, and made up into suppositories with cacao butter. In many cases he has obtained excellent results, notably in one where there was an extensive effusion into the pouch of Douglas, which was entirely absorbed in sixteen days, ichthyol being used both internally and externally. In no case was any untoward result noted. The disagreeable smell of the ichthyol was covered by the addition of cumarin. —*The Lancet.*

BISULPHIDE OF CARBON IN DYSENTERY.

Dr. Jakobleff reports in the proceedings of a Russian provincial medical society that he has found great benefit in dysentery from the employment of bisulphide of carbon—of course largely diluted. The quantity given per diem was from three to five grains in half a tumbler of water or milk, with a little peppermint. First of all, however, one or two grains of calomel were administered hourly until calomel stools had been induced, and during this time enemata containing a grain and a half of sulphide of carbon in an ounce and a half of water were administered twice daily. Great improvement was produced, and frequently this was as rapid as it was marked, so that there could not be any doubt that it had been brought about by the bisulphide of carbon treatment.—*The Lancet.*

IODOFORM EMULSION IN COLD ABSCESS.

Dr. Jasinski, of Cracow, has treated eighty-six cases of cold abscess by means of injections through a trocar of iodoform emulsion with encouraging results. A certain number were cured by a single injection, others after two or three injections. In eleven cases after the injection the abscess broke, a large quantity of pus mixed with iodoform being discharged. These were all cured without any further surgical interference. In nineteen cases an incision had to be made, the cavity was then washed out with carbolized water, iodoform emulsion injected, and the wound sewn up after a drainage tube had been inserted. In some of these cases the injection had to be repeated several times. Though 180 grams of a 10 per cent. emulsion were injected at once no toxic symptoms were ever observed.—*The Lancet.*

PRACTICAL NOTES.

ALTERATIVE PILL.

In adults you will often meet with the following train of symptoms: Vomiting, coated tongue, foul breath, accompanied by more or less headache; in short, I may say an attack of biliousness or a bilious attack—but it differs in some respects from the cases in which calomel is indicated. Something is wanted to allay the pain, and for this purpose opium in small doses will be found useful. Again, we desire to add to the effect of the mercurial preparation by incorporating into our prescription some drug which will favor the activity of the liver and increase secretion. Ipecac answers our purpose admirably, and, fortunately, both of these drugs have the effect of obtunding the sensibility of the sensory nerves. Recalling the formula, it will be seen that it embraces practically the ingredients contained in an ordinary Dover's powder, except that it has in addition ½ gr. of blue mass.

℞. Pulv. opii, } . . . . . gr. ½.
Pulv. ipecac, }
Massæ hydrargyri . . . . . gr. ss.
M. et ft. tab. trit. No. 1.

If deemed best, calomel may be substituted for the blue mass. Taking it all in all, the value of this pill for the class of cases indicated can scarcely be overestimated. There is not sufficient opium to make the pill dangerous, and the same is true of the blue mass; but if they are taken too freely, or when taken for too long a time, we shall have the irritating effect of the ipecac, and vomiting will follow. It is surprising the number of cases in which this combination will be found available.—*N. Y. Med. Jour.*

BROMIDE OF ETHYL ANÆSTHESIA.

For nearly two years Dr. E. Haffter employed bromide of ethyl as an anæsthetic, and during that time he has administered it to more than 200 patients (*Correspondenz-Blatt für Schweizer Aerzte*, March, 1890). He believes it to be a safe and valuable anæsthetic for minor surgical operations. Merck's preparation is the best according to the author, and its purity can be determined by the fact that if poured upon the hand it should evaporate rapidly and without leaving any residue; that if shaken with water and filtered, the filtrate should be neutral, and give no reaction with nitrate of silver; and that the addition of concentrated sulphuric acid should not cause a brown color to appear.

The author concludes his paper with the following summary:

1. Bromide of ethyl acts with great rapidity, and usually without a period of excitement; it is perfectly safe when used in small amounts, and there are seldom any unpleasant after-effects.

2. The best method of administration is to pour the entire quantity to be used (1 to 5 drachms) on an impermeable mask, which is placed close to the patient's mouth and nose.

3. In most cases the operation can be begun in from fifteen to twenty seconds after the first inhalation, though the duration of anæsthesia will be very short, and only suitable for minor operations, opening abscesses, etc.

4. There are a few patients, chiefly alcoholics, who cannot be anæsthetized by the agent.

5. There are no contra-indications to the use of bromide of ethyl employed in small amounts and for short operations.

RAPID CURE OF ERYSIPELAS BY ERGOTINE.

Dr. Geo. C. Kingsbury (*Brit. Med. Jour.*) says: For erysipelas, like most other painful diseases, hosts of remedies have been suggested, and ever since Hueter discovered cocci in this particular ailment all sorts of germicide applications have been tried, with and without success. The most recent favorites are carbolic acid, ichthyol, and creolin. Without wishing in the slightest to underestimate the value of these agents, I would like to call attention to what has been my invariable treatment for at least five years. In every case I have used ergotine applied with a camel's hair brush to and around the affected area, and have found it a painless, rapid, and almost certain cure; in fact, I cannot recall a single case in which it has disappointed me. It is best used in the form of a 50 per cent. solution in distilled water, painted on frequently. Generally one or two applications suffice to diminish all feeling of tension, and it is rarely that the pain is not quite conquered in twenty-four hours, leaving the patient comparatively well. In many cases I have relied solely on the ergotine, not prescribing any internal medicine.

In writing this note I have no desire to be thought original, for I saw the treatment recommended in some medical paper of about the year 1884 or 1885, but I cannot lay my hands on it now, and fear the treatment has not had a fair trial, as I never hear of its being adopted. Neither do I pretend to explain the action of the ergotine, but the effective way in which it cuts off the excessive blood supply to an over vascular area naturally suggests its trial in other passive congestions, and in these also I have found it very useful.

In the *Year-Book of Treatment* for 1890, p. 255, I find it stated that Dr. F. Nesterovsky describes two cases in which he has used a mixture of "extractum secalis cornuti" and glycerine with success, the temperature becoming normal in six days. This encourages me to ask for a fresh trial of ergotine, which I have found in not fewer than thirty cases to practically cure in one day.

DOMESTIC CORRESPONDENCE.

The Importation of Foreign Natural Mineral Waters.

To the Editor:—At a meeting of the New York County Medical Association held May 19, 1890, the following resolution was adopted:

P. BRYNBERG PORTER, M.D.,
Recording Secretary.

Resolved, That the New York County Medical Association, a representative body composed of five hundred practicing physicians in the City of New York, believing that it is for the best interests of the people of the United States that all foreign natural mineral waters should be imported free of duty, respectfully urges upon the National Senate and House of Representatives that the provisions now in force relating to foreign natural mineral waters, and to the bottles in which they are imported, should be re-enacted in any tariff which is sanctioned by them.

What Killed the Woman?

To the Editor:—On May 30, I was summoned to the bedside of a woman reported to be in labor, arriving at 8 o'clock in the morning. She was 31 years old, and had had two children, the last one six years ago. Her former labors were described as energetic and soon over with. She was well developed, active and accustomed to labor. At 5 o'clock in the morning she was getting breakfast, and being suddenly seized with pain, went to bed. When I arrived, the lady attending her told me the patient was "wasting." I found her with a quick, feeble pulse, pale, agitated, body cool, and seemingly in the condition of a person suffering from hæmorrhage. On examination, the os was found closed tight, and it was with much difficulty that I introduced the tip of the index finger. The patient said her time was not up, and suspecting placenta prævia, I forced the finger through the cervical canal, and swept the inner circle, but found no placenta within reach. The os, instead of being thin, as usual near term—for she expected confinement within a month—was nearly an inch thick, freely movable, and easily drawn forward. While examining, I waited for uterine contractions, but though the patient complained of constant suffering located low across the bowels in front, and also at the summit of the uterus, yet the os indicated no contractions. A closer examination of the patient's clothing revealed the fact that what was supposed to be hæmorrhage was simply a discharge of the amniotic fluid, tinged with a reddish color sufficient to stain the bed and linen, but this had not been unusually profuse. Not a clot was to be found, and each examination revealed only a slight sanguineous discharge. Digital examination further revealed the head well down against the os pubis, with ample room in the sacral region, but there was not sufficient dilatation to make out the exact presentation. Nausea was present most of the time, but did not cause much vomiting. There was some thirst, but not of an urgent nature, certainly not as much as one would expect in a case of profuse hæmorrhage. The theory of hæmorrhage was therefore dismissed, and the case seemed one where a rupture of the membranes had occurred prematurely, followed by shock to the nervous system. The only thing to be done, apparently, was to await the natural development of uterine action.

At first I gave whisky freely to counteract depression, after which the pulse improved, the body grew warm and the general condition became better. In a few hours I gave ergot tentatively, but with no results. Constant misery continued, and nausea, feeble, quick pulse, restlessness, ringing of the ears, some dimness of vision, but no dilatation of the os, and no uterine action. Another symptom complained of was hardness of the prominent portion of the abdomen, but I attributed this simply to the escape of the waters. About noon—four hours after my arrival—I gave ¼ gr. of morphine. In an hour or two she became more quiet, slept some, and by 4 o'clock seemed much easier. Having complained of previous constipation, I gave magnesia sulph. and directed that it be repeated every hour until it acted. The patient being more comfortable, I then took my leave, directing them to summon me at once when labor became apparent. This was 4 o'clock P.M. She remained easy until 10. After midnight her condition became more urgent and I was again summoned. Arriving at 3, I found nearly the same condition as in the morning before—thready pulse, cold extremities, and great prostration, but still no uterine action and no dilatation. It was evident that something must be done, and that quickly. The nearest accessible doctor was eight miles away. However, a messenger was dispatched, and while I was deliberating whether I could possibly force my hand through an os which barely admitted the tips of two fingers, turn and deliver, the patient expressed a wish to get up. I advised her urgently to lie still, but being a woman of will, she insisted on getting out, and did so with the help of her husband, when she was immediately seized with syncope. Hastily they replaced her in bed, but consciousness did not return, and in five minutes she was dead.

Of course I was shocked, the bystanders were shocked, and the family were thrown into transports of grief. In a practice of nearly twenty years I had never witnessed anything approaching this before. Without convulsions, without visible hæmorrhage, without a single expulsive pain, without any special cause for alarm during a stay of eight hours throughout the day, with-

out the labor having actually begun, as it would seem, there being no alternations of pain, no distress in the back so usual in the first stage, but only a constant misery at the fundus and apex of the uterus, attended with a colored amniotic discharge and some pronounced symptoms of shock, this woman died almost before any one realized that she was in any danger. In the absence of a post-mortem the question of absorbing interest to my mind is—What killed the woman?

JAMES L. TAYLOR, M.D.,

Wheelersburg, O., June 14, 1890.

AMERICAN MEDICAL ASSOCIATION.

Forty-first Annual Meeting, held at Nashville, Tenn., May 20-24, 1890.

Section of Obstetrics and Gynecology.

FIRST DAY.

The first session was called to order in the rooms of the Y. M. C. A. at 3 P.M. by Dr. W. H. Wathen, of Louisville, Ky., who introduced the Chairman, Dr. William Warren Potter, of Buffalo, N. Y., who delivered the Annual Address (see page 785).

Dr. William H. Wathen then read a valuable paper upon the subject of *Intraligamentary Cysts*, which was duly received and referred for publication.

The next paper was submitted by Dr. H. O. Marcy, of Boston, on *The Surgical Treatment of Non-pedunculated Abdominal Tumors*. This and the preceding paper were jointly discussed by Drs. Ranney, Moss and Reed, and by the authors in conclusion.

The fourth paper presented was prepared by Dr. A. Vanderveer, of Albany, N. Y., and read by title, as follows: *She Supposed it Was Her Change of Life*.

Dr. Franklin H. Martin presented as the next paper, *A Plea for Early Vaginal Hysterectomy for Cancer of the Uterus*.

Dr. Charles A. L. Reed, of Cincinnati, followed with a paper entitled, *Primary and Ultimate Results of Vaginal Hysterectomy for Cancer*.

These papers were jointly discussed by Drs. Dunning, Groff, Reamy, Wathen, McIntyre, Moss and the authors.

The Section then adjourned.

SECOND DAY.

The second session of the Section was called to order on Wednesday, May 21, at 2 P. M., Chairman Potter presiding.

Dr. Ely Van der Warker, of Syracuse, N. Y., read a paper entitled, *Stricture of the Urethra in Women*.

The report of the Nominating Committee was next presented by Dr. Marcy as the result of election. Dr. Charles A. Reed, of Cincinnati, was made Chairman, and Dr. H. A. Kelly was elected Secretary for the ensuing year.

Dr. Van der Warker's paper was then discussed by Dr. Currier, of N. Y.; Dr. Englemann, of St. Louis; Reed, of Ohio, and the author.

Dr. Andrew F. Currier, of N. Y., then read a paper on *A New Operation for the Relief of Prolapse of Anterior Vaginal Wall*. Discussion followed by Drs. Van der Warker, Reamy, Johnston, of Danville, Ky.; Hoffman, of Philadelphia; Engleman, Kerr, Dunlap, and the author.

Dr. E. W. Mitchell, of Cincinnati, read *A Report of Two Cases of Hyperemesis Gravidarium*.

Chairman Potter read a telegram announcing the death of Dr. Wm. H. Byford, of Chicago.

On motion a committee, consisting of Dr. F. H. Martin, Dr. Reamy and Dr. J G. Meacham, was appointed to draft suitable resolutions in connection with the death of Dr. Byford.

Dr. Mitchell's paper was then discussed by Dr. Johnson, of S. C., and by Dr. Rosewater, of Omaha.

Dr. Aug. P. Clark submitted a paper upon *The Treatment of Placenta Prævia*, which was read by title.

Dr. L. H. Dunning, of Indianapolis, Ind., read a paper on *Uterus Bilocularis*, which was discussed by Dr. Currier and the author.

Dr. T. B. Greenley, of West Point, Ky., presented a paper upon *Asepsis vs. Antiseptics as a Prevention of Puerperal Septicæmia*, which was discussed by Drs. Currier, Hoffman, Shoemaker, add the author.

The next paper was submitted by Dr. John B. Meacham, of Racine, Wis., entitled, *The Great Utility of Bleeding in Puerperal Eclampsia*. The paper was discussed by Drs. Reed, Greenley, Hoffman, Kerr, Pomeroy and Davis.

THIRD DAY.

The third day's session was duly called to order by the Chairman, Dr. Potter.

Dr. Marie B. Werner, of Philadelphia, read a paper on *Fistulous Escape of Ligatures After Abdominal Operations*. This led to a full discussion, in which Dr. Wathen, of Louisville; Dr. Reamy, of Cincinnati; Currier, of N. Y.; Sell, of Penna.; Kelley, of Baltimore; Reed, of Ohio; Meyer, of Me.; Johnston, of Danville, Ky.; Price, of Philadelphia; Van der Warker and Hoffman, took part.

Dr. M. B. Ward, of Topeka, Kan., submitted a paper on *Diseases of the Female Pelvic Organs, and When to Operate*. This paper was read by title.

Dr. Hoffman next presented *A Plea for the General Adoption of Traction Forceps*. Discussed by Drs. Price, Currier, and the author.

Dr. Joseph Price, of Philadelphia, presented *A Retrospect of Pelvic Surgery*.

Dr. Geo. E. Shoemaker, of Philadelphia, read a paper on *Drainage in Abdominal Surgery*. The two papers were discussed jointly by Drs. Hoffman, Meyer, Reed, Hypes, Barnes and the author.

A paper prepared by Dr. I. S. Stone, entitled, *Psychical Results of Gynecological Operations*, was read by title.

Dr. Deahofe, of Potsdam, O., presented a paper, read by title, on *Puerperal Albuminuria*.

A short and pertinent farewell address was then delivered by the retiring Chairman, Dr. Potter, who, at its conclusion, introduced the Chairman-elect, Dr. C. A. Reed, of Cincinnati, and after a short address the final adjournment was had.

TREASURER'S REPORT.

DR. RICHARD J. DUNGLISON, Treasurer, in account with the American Medical Association, for Fiscal Year to May 22, 1890, inclusive.

DR. 1889.		
June 26. To cash balance, as per report at Newport meeting	$2,845.65	
June 28. To amount received from delegates and members at Newport meeting	2,705.00	
1890.		
May 16. Amount of annual dues from members to date	11,705.00	
May 20. To amount received at office of publication of Journal July 1st, 1889, to end of its fiscal year	11,563.37	
		$28,819.02
CR. 1889.		
June 29. By cash paid for postage, telegrams, expressage, stamped envelopes, etc	$ 69.85	
July 8. By cash paid Ward & Barnitz, printing bills	5.00	
July 8. By cash paid rental P. O. box	3.00	
July 8. By cash paid collectors' commissions on dues	38.50	
July 12. By cash paid Dr. W. B. Atkinson, permanent Secretary, expressage, telegrams, postage, etc., to date	116.90	
July 12. By cash paid Dr. R. J. Dunglison, Treasurer, expenses of travel, postage, expressage, etc	68.21	
July 15. By cash for stamped envelopes	70.40	
July 17. By cash paid Ward & Barnitz, envelopes, postals, notices, etc. (1888-9 account)	27.08	
July 26. By cash paid Wm. F. Fell & Co., printing stubbed receipt books, blanks and envelopes	12.50	
July 26. By cash paid Dr. H. R. Storer, Chairman Com. of Arrangements at Newport meeting, rental of halls, printing	1,093.24	
Aug. 26. By cash paid Wm. F. Fell & Co., postals and stamped envelopes for Permanent Secretary	19.50	
Oct. 1. By cash paid for rental of P. O. box	3.00	
Oct. 24. By cash paid for quarto circulars for Permanent Secretary	13.25	
Oct. 31. By cash paid Wm. F. Fell & Co., printing notices and circulars	5.25	
Oct. 31. By cash paid Wm. F. Fell & Co., printing letter circulars for Permanent Secretary	4.25	
Oct. 31. By cash paid Ward & Barnitz, postals and printing	5.25	
Oct. 31. By cash paid collectors' commissions, postals, stamped envelopes and postage	79.95	
Nov. 9. By cash paid Ward & Barnitz, postals and printing	5.00	
Nov. 21. By cash paid Ward & Barnitz, postals and printing	1.00	
Dec. 16. By collection charges Farmers' and Mechanics' National Bank	16.70	
1890.		
Jan. 2. By cash paid collectors' commissions, stamped envelopes, postals and postage	53.35	
Jan. 2. By cash paid Ward & Barnitz, printing notices	1.25	
Jan. 2. By cash paid for rental of P. O. box	3.00	
Jan. 30. By cash paid Ward & Barnitz, postals, envelopes, note sheets and printing	10.02	
Feb. 11. By cash paid Geo. S. Davis, subscription to "Index Medicus"	10.00	
Feb. 11. By cash paid Ward & Barnitz, printing drafts	2.50	
Mar. 13. By cash paid Wm. F. Fell & Co., printing drafts and notices	4.50	
Mar. 14. By cash paid William F. Fell & Co., stamped envelopes and printing letter circulars	20.25	
April 1. By cash paid rental P. O. Box	3.00	
April 11. By cash paid Ward & Barnitz, printing slips, bills, etc	13.70	
May 14. By cash paid A. H. Coppuck, typewritten circular	1.50	
May 16. By cash paid for postage, telegrams, stamped envelopes, etc	63.81	
May 16. By cash paid Drexel & Co., collection charges on drafts	74.55	
May 16. By cash paid exchange on checks deposited at Farmers' and Mechanics' National Bank	45.15	
May 16. By cash paid Wm. F. Fell & Co., printing membership receipts	1.50	
May 22. By cash paid office of publication of the Journal to date	10,806.21	
May 22. By cash expended by office of publication of the Journal, June 15, 1889, to end of its fiscal year	11,343.70	
May 22. By cash balance	4,703.20	
		$28,819.02

FOREIGN DELEGATES.

J. B. Alford, Grand Rapids, O.; Winslow Anderson, San Francisco, Cal.; H. St. Clair Ash, Philadelphia; R. P. Andrews, Cambridge, Mass.; C. H. Alden, St. Paul, Minn.; W. H. Bell, Logansport, Ind.; R. B. Bontecou, Troy, N. Y.; H. T. Byford, Chicago, Ill.; L. D. Bulkley, New York; H. H. Beidler, Baltimore, Md.; D. R. Brower, Chicago; J. G. Berry, Chicago; E. Borck, St. Louis, Mo.; J. H. Baxter, U. S. Army; Leartus Connor, Detroit, Mich.; G. I. Cullen, Cincinnati, O.; J. J. Chisolm, Baltimore, Md.; S. A. Conklin, Canton, O.; E. W. Cushing, Boston, Mass.; A. P. Clarke, Cambridge, Mass.; I. DeZouche, Gloversville, N. Y.; W. M. Drake, Lamar, Tex.; W. H. Daly, Pittsburgh, Pa.; H. W. Dudley, Hillsboro, Tex.; R. F. Eads, Marshall, Tex.; J. Elsner, Denver, Col.; C. R. Earley, Ridgway, Pa.; E. F. Eldridge, New London, Wis.; V. A. Ellsworth, East Otto, N. Y.; W. Flynn, Marion, Ind.; S. W. Fowler, Delaware, O.; H. Fleischer, New Haven, Conn.; A. J. Fuller, Bath, Me.; T. M. Flandrau, Rome, N. Y.; C. H. Fisher, Providence, R. I.; T. A. Foster, Portland, Me.; E. Griswold, Sharon, Pa.; S. C. Gordon, Portland, Me.; N. Guhman, St. Louis, Mo.; A. L. Gihon, U. S. N.; E. C. Goodrich, Augusta, Ga.; E. Grissom, Raleigh, N. C.; G. L. Greenawalt, Ft. Wayne, Ind.; Hugh Hamilton, Harrisburg, Pa.; A. C. Holtzendorff, Plymouth, Ind.; M. L. Herr, Lancaster, Pa.; C. C. Hunt, Dixon, Ill.; Fairfax Irwin, Chelsea, Mass.; J. F. Jenkins, Tecumseh, Mich.; Reeves Jackson, Chicago; W. J. K. Kline, Greencastle, Pa.; T. C. Kennedy, Shelbyville, Ind.; A. Kaiser, Detroit, Mich.; W. F. Knox, McKeesport, Pa.; A. F. A. King, Washington, D. C.; C. B. Kibler, Corry, Pa.; G. H. Knight, Lakeville, Conn.; J. K. Lineaweaver, Columbia, Pa.; E. Lester, Seneca Falls, N. Y.; J. A. Larrabee, Louisville, Ky.; D. Laferte, Detroit, Mich.; A. M. Miller, Bird in Hand, Pa.; J. H. Musser, Philadelphia; E. S. McKee, Cincinnati, O.; W. H. Myers, Fort Wayne, Ind.; G. M. B. Maughs, St. Louis, Mo.; Liston H. Montgomery, Chicago; H. O. Marcy, Boston; L. Mackall, Washington, D. C.; G. C. Mosher, Kan-

sas City, Mo.; Robert Newman, New York; A. L. Norris, Cambridge, Mass.; G. D. Nutt, Williamsport, Pa.; J. E. Owens, Chicago; S. N. Nelson, Chicago; J. M. Pace, Dallas, Tex.; M. G. Parker, Lowell, Mass.; D. W. Prentiss, Washington, D. C.; P. P. Pomerene, Berlin, O.; E. von Quast, Kansas City, Mo.; J. H. Rauch, Springfield, Ill.; J. A. Ritchey, Oil City, Pa.; D. N. Rankin, Pittsburgh, Pa.; B. K. Rachford, Newport, Ky.; E. C. Sattler, Cincinnati, O.; N. Senn, Milwaukee, Wis.; Eugene Smith, Detroit, Mich.; R. Stephenson, Adrian, Mich.; H. Suter, Georgetown, D. C.; J. L. Stewart, Erie, Pa.; Carl Seiler, Philadelphia; W. C. Short, LaGrange, Ind.; Catherine B. Slater, Chicago; Theo. P. Simpson, Beaver Falls, Pa.; W. C. Simpson, Beaver Falls, Pa.; W. J. Scott, Cleveland, O.; J. V. Shoemaker, Philadelphia; J. M. Toner, Washington, D. C.; Max Thorner, Cincinnati, O.; E. S. Talbot, Chicago; J. D. Thomas, Pittsburgh, Pa.; F. C. Thayer, Waterville, Me.; J. E. Tefft, Springfield, Mo.; J. S. Tipton, Hillsville, Va.; A. Vogler, Newark, N. J.; T. F. Weaver, Collinsville, Ala.; R. H. Ward, Troy, N. Y.; T. L. White, McKeesport, Pa.; J. H. Yarnalls, Georgetown, D. C.; H. B. Young, Burlington, Ia.; F. E. Yoakum, Swedesport, La.; T. J. Young, Titusville, Pa.

INTERNATIONAL CONGRESS.

Tenth International Medical Congress, Berlin, 1890.

Section XIV—Diseases of the Teeth.

By the Committee of Organization the undersigned have been nominated American officers of the Section: Honorary Presidents—W. C. Barrett, M.D., D.D.S., Buffalo, N. Y.; J. Taft, M.D., D.D.S., Cincinnati, O.; Eugene S. Talbot, M.D., D.D.S., Chicago; H. J. McKellops, D.D.S., St. Louis. Honorary Secretary—R. R. Andrews, D D S., 432 Harvard St., Cambridge, Mass.

Two official papers will be read. One by Dr. Barrett, subject: "Crown and Bridge Work;" the other by Eugene S. Talbot, subject: "Irregularities of the Teeth."

Those who wish to offer any communication to the Section on Diseases of the Teeth, or who have anything of interest to present, should send a sufficient abstract of the paper, or a full description of the apparatus or device, to Prof. Dr. W. D. Miller, West Voss Strasse, No. 32, Berlin, Germany; or it may be sent to the Honorary Secretary, at Cambridge, Mass., for transmission to Berlin.

THERE were over sixty exhibitors at the Nashville meeting of the Association.

BOOK REVIEWS.

TENTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF ILLINOIS. By J. H. RAUCH, M.D., Secretary. Pp. xci, 313. Springfield, Illinois. 1890.

The admirable character of the work done by the Illinois State Board of Health is well illustrated in the contents of this report. The greater portion of the volume is occupied with the official register of physicians and midwives which is very complete. The physician's register gives the name, date of registration, school of practice, residence, age, nativity and basis of certificate in each instance. Illinois is the only State in the Union which exercises supervision over midwives, and the weeding-out process which has been so successfully applied to the medical profession has also accomplished considerable good in restraining unqualified women from the practice of midwifery. The proper control of midwives is one of the most important subjects that can occupy the attention of the State Boards of Health, and we hope that the other States will soon follow the lead of Illinois.

In the present report a number of interesting matters relating to interstate quarantine are referred to, particularly the action of the Board regarding an outbreak of cholera; these together with a paper by Dr. Rauch on the history of the Illinois Army Board of Medical Examiners, and abstracts of the Board's minutes add much of interest to the Report.

MISCELLANY.

THE MCLEAN COUNTY (ILL.) MEDICAL SOCIETY met on June 2d at the office of Drs. Mammen and Godfrey, Bloomington. A large number of the members was present. In the absence of both President and Vice-President Dr. Holderness, of Chenoa, occupied the chair. Dr. Taylor reported a case of orbital tumor with nasopharyngeal catarrh, and one of incontinence of urine with distended bladder; also a case of purpura and eczema together. Dr. Vandervoort reported a case of high specific gravity of urine in an apparently healthy man. Dr. Rhoda Galloway reported and presented a specimen of ovarian tumor and of fibroid polypus. Dr. Mammen read an essay on "Infant Feeding," and exhibited an apparatus for sterilizing milk. The meeting adjourned to meet the first Monday in September.

HEALTH IN MICHIGAN.—For the month of May, 1890, compared with the preceding month, the reports indicate that typho-malarial fever, cholera infantum, cholera morbus and whooping-cough increased, and that typhoid fever, membranous croup, puerperal fever and pneumonia decreased in prevalence.

Compared with the preceding month the temperature was higher, the absolute humidity was more, the relative humidity was slightly more, and the day and the night ozone were more.

Compared with the average for the month of May in

the four years 1886–1889, membranous croup and cerebro-spinal meningitis were more prevalent, and small-pox, typhoid fever, cholera morbus, cholera infantum, dysentery, intermittent fever and scarlet fever were less prevalent in May, 1890.

For the month of May, 1890, compared with the average of corresponding months in the four years 1886–1889, the temperature was lower, the absolute humidity was less, the relative humidity was slightly more, the day ozone and the night ozone were considerably more.

Including reports by regular observers and others, diphtheria was reported present in Michigan, in the month of May, 1890, at 62 places, scarlet fever at 49 places, typhoid fever at 24 places, and measles at 113 places.

Reports from all sources show diphtheria reported at 9 places more, scarlet fever at 5 places less, typhoid fever at 7 places more, and measles at 17 places more in the month of May, 1890, than in the preceding month.

TIGHT COLLARS AND VISION.—The influence of tight collars in impeding the circulation in the head by pressing on the jugular veins is well known to military surgeons with the troops in India; but the bad effects of such pressure in cooler climates has been demonstrated by the observations of Prof. Förster, of Breslau, who states that three hundred cases have come under his notice in which the eyesight has been affected by the disturbance of circulation caused by wearing collars that were too small. A large number of these cases were probably subjects of myopia.—*Medical Record.*

LETTERS RECEIVED.

Dr. W. W. Potter, Buffalo, N. Y.; F. A. Davis, Chicago; Battle & Co., St. Louis, Mo.; The Imperial Granum Co., New Haven, Conn.; F. G. Alger, Streator, Ill.; Dr. A. A. Warterfield, Union City, Tenn.; Dr. Albert E. Sullard, Franklin, N. Y.; Dr. J. G. McDougal, New Lexington, O.; The Sun, Williamsport, Pa.; Dr. Wm. H. Robb, Amsterdam, N. Y.; Dr. P. R. Hardee, Hampton, N. C.; Dr. G. V. Woolen, Indianapolis, Ind.; Ragsdale & Chassell, LeMars, Ia.; Dr. C. T. Chinn, Blue Grass, Ia.; Dr. H. R. Fox, Carrville, Tenn.; Dr. J. Stedman, Triumph, Ill.; Dr. G. D. Lain, Camp Colorado, Tex.; Dr. R. Callaghan, Kansas City, Mo.; Dr. B. C. Anderson, Beardstown, Ill.; Allen & Yates, Buffalo, N. Y.; Dr. A. A. Sevann, Mt. Sylvan, Tex.; Dr. O. Hasencamp, Toledo, O.; Dr. H. Alvis, Alma, Ark.; Dr. J. C. Blanton, Newmarket, Ala.; Dr. D. Street, Baltimore, Md.; E. Steiger & Co., New York; Dr. G. W. Shidler, York, Neb.; Dr. C. W. Simpson, Ferris, Tex.; Dr. S. Laughton, Bangor, Me.; University of Pennsylvania Press, Philadelphia; Rio Chemical Co., St. Louis, Mo.; Dr. R. Newman, A. A. Marks, New York; Dr. Thos. B. Evans, Baltimore; W. G. Farrar, Chicago; Dr. H. R. Storer, Newport, R. I.; Dr. A. F. Angell, S. Jacksonville, Fla.; Dr. H. L. Taylor, Asheville, N. C.; T. W. Hannaford, London, Eng.; Dr. K. Ruffin, Norfolk, Va.; Dr. D. J. McCaffrey, Blackstone, Mass.; Dr. S. T. Armstrong, New Orleans, La.; Dr. H. W. White, Boston, Mass.; H. H. Howe, Weston, Vt.; Dr. L. A. Roller, Detroit, Mich.; Dr. J. J. Bland, Houma, La.; Dr. R. Baily, Staten Island, N. Y.; Dr. T. H. Lane, Lincoln, Neb.; Wm. D. McGowan, Pittsburg, Pa; The Medical Advance, Ann Arbor, Mich.; W. F. Ford, New York; Dr. R. M. Wyckoff, Dr. E. J. C. Minard, Brooklyn, N. Y.; Dr. C. F. Starkweather, Philadelphia; Thos. Leeming & Co., Geo. Tieman & Co., Dr. P. B. Porter, The Drevet Mfg. Co., New York; Dr. B. Brock, Olin, Ia.; F. B. Van Siclen, Tottenville, N. Y.; Dr. H. Durand, Paris, France; Dr. J. A. Scroggs, Keokuk, Ia.; Armour & Co., Chicago; Dr. N. Senn, Milwaukee, Wis.; Dr. B. A. Watson, Jersey City, N. J.; Dr. J. B. Hamilton, Dr. G. L. Magruder, Washington, D. C.; C. H. Christensen, Fremont, Neb.; The Victor Safe and Lock Co., Cincinnati, O.; Dr. J. H. Cuffman, Dalark, Ark.; Dr. J. H. Gheesling, Greensboro, Ga; J. E. Ruebsam, Washington; Dr. H. B. Burkett, Hillsboro, Ala.; Dr. J. L. Taylor, Wheelersburg, O.; Dr. B. M. Ricketts, Cincinnati, O.; Dr. A. L. Hummel, Philadelphia; Dr. G. F. Cook, Oxford, O.

Official List of Changes in the Stations and Duties of Officers Serving in the Medical Department, U. S. Army, from May 31, 1890, to June 6, 1890.

First Lieut. Charles Willcox, Asst. Surgeon, is granted leave of absence for ten days, with the approval of the Secretary of War. Par. 16, S. O. 126, A. G. O., Washington, May 29, 1890.

Major Peter J. A. Cleary, Surgeon, is granted leave of absence for six months, on surgeon's certificate of disability, by direction of the Secretary of War. Par, 4, S. O. 127, A. G. O., Washington, May 31, 1890.

Major Henry McElderry, Surgeon, is granted leave of absence for seven days, to take effect upon the final adjournment of the Army Medical Examining Board, by direction of the Acting Secretary of War. Par. 7, S. O. 127, A. G. O., Washington, May 31, 1890.

By direction of the Secretary of War, Capt. William D. Dietz, Asst. Surgeon, having completed at New York City the duties assigned him in S. O. 29, Div. of the Pacific, April 30, 1890. will return to his station in that Division. Par. 5. S, O. 119, A. G, O., Washington, June 3, 1890.

Official List of Changes in the Medical Corps of the U. S. Navy for the Week Ending June 7, 1890.

P. A. Surgeon I. W. Kite, detached from Naval Hospital, Pensacola, and to hospital, New York.

P. A. Surgeon Thos. C. Craig, detached from Naval Hospital, New York, and to the U. S. S. "Vesuvius."

P. A. Surgeon Frank Anderson, granted leave of absence for the month of June.

Asst. Surgeon F. N. Ogden, ordered for examination preliminary to promotion.

Asst. Surgeon S. S. White, ordered for examination preliminary to promotion.

P. A. Surgeon Henry G. Beyer, ordered on duty on the U. S. S. "Yantic."

Surgeon Manly H. Simons, detached from Widow's Island Hospital and waiting orders.

Surgeon J. A. Hawke, ordered to Widow's Island Hospital and attending officers of Navy and Marine Corps at Portsmouth, N. H.

Official List of Changes of Stations and Duties of Medical Officers of the U. S. Marine-Hospital Service, for the Three Weeks Ending May 31, 1890.

Surgeon George Purviance, detailed as chairman Board of Examiners. May 31, 1890.

Surgeon W. H. Long, granted leave of absence for three days. May 19, 1890.

Surgeon John Godfrey, detailed as member of Board of Examiners. May 31, 1890.

Surgeon Fairfax Irwin, detailed as recorder, Board of Examiners. May 31, 1890.

P. A. Surgeon H. R. Carter, ordered to examination for promotion. May 31, 1890.

P. A. Surgeon C. E. Banks, to proceed to Boston, Mass., on special duty. May 12, 1890.

P. A. Surgeon C. T. Peckham, granted leave of absence for eight days. May 14, 1890.

P. A. Surgeon R. P. M. Ames, to proceed to Memphis, Tenn., for temporary duty. May 14, 1890. To proceed to Gulf Quarantine Station for temporary duty. May 31, 1890.

Asst. Surgeon T. B. Perry, ordered to examination for promotion. May 31, 1890.

Asst. Surgeon A. W. Condict, granted leave of absence for twenty-two days. May 24, 1890.